

Skeptical Inquirer

THE MAGAZINE FOR SCIENCE AND REASON

Volume 27, No. 6 • November/December 2003



Ann Druyan Talks About Science, Religion, Wonder, Awe . . . and Carl Sagan

Art and Science

Intelligent Design

**Neither Intelligent
Nor Designed**

**Fellowship
of the Rings**

**UFO Rings
and Fairy Rings**

**(Larry) King
of the Paranormal**

**Sylvia Browne
TV Psychic
Sidesteps
Test Challenges**



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EDITOR'S NOTE

Ann Druyan Evokes the Passion of Science

As soon as Ann Druyan spoke, I knew I wanted to share her words with you. Her informal talk came at a small conference, "The Assault on Reason," opening the auditorium at our new Center for Inquiry—West in Los Angeles. Her words ring with a passion for science and a determination to share with others the emotional uplift of learning about the wonders of the cosmos. And she wonders why we leave to religion that sense of awe that many of us find in scientific discoveries about our origins, the depth of time, the vastness of space, and our connections to it all. Her article based on that talk leads this issue.

She speaks of "the great bifurcation" that happened four or five hundred years ago when churches agreed to stop torturing scientists and scientists "pretended that knowledge of the universe has no spiritual implications. . . . There is a great wall that separates what we *know* from what we *feel*." She writes of reaching people by combining "rigorous science with that soaring, uplifting feeling" when we encounter beautiful revelations about how we are all part of "this greater fabric of life." You can see for yourself what I am talking about.

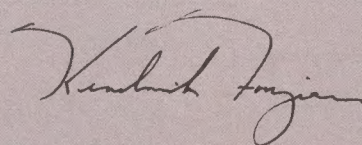
If in anything you read there you find yourself recalling some of the grace and evocative prose you remember reading Carl Sagan, it is no accident. For twenty years, Ann and Carl shared their lives, personally as wife and husband, and professionally as collaborators on books and the majestic television series *Cosmos*. She shared bylines with him on *Shadows of Forgotten Ancestors* and *Comet* and was a credited contributor to at least four other books, including his final two. It is clear they shared a poetic embrace with the universe. They both have a cosmic perspective, and a facility of expression that brings its wonders to us with a power that few others have been able to evoke.

* * *

Their works always combined soaring prose with inspiring visuals—emotionally evocative photographs and artist's paintings. So it is a pleasure to present immediately following Ann's article an essay on art and science by Stephen Nowlin. He discusses how some artists have gained a new interest in science and how "in combination art and science can forge a kind of nonsupernatural spirituality—a deep appreciation for the beauty and untamed complexity of the real."

* * *

The next two articles also closely complement each other. Chris Mooney, a new SKEPTICAL INQUIRER contributing editor, probes into the regrettably credulous fascination with the paranormal of CNN's Larry King. In his nightly CNN show *Larry King Live*, King usually does legitimate journalism and plays it straight, but when it comes to psychics and other pseudoscientific matters the proponents get a mostly free, uncritical ride. Bryan Farha investigates one particular King favorite, "spiritual medium" Sylvia Browne. He documents how Browne has repeatedly reneged on her on-camera promises to submit her claims to testing. Over and again, on the King show, she has promised to accept the challenges, then refused to follow through. Yet King's producers keep bringing her back to spout the same old discredited stuff. That's behavior not befitting a King.



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NEWS AND COMMENT

'Bogus' Poll of Scientists Latest Twist in ID/Creationists' Fight Against Science Standards; Scientists Battle Back

KENDRICK FRAZIER

One of the latest tactics of "intelligent design" proponents in their battle to water down the teaching of evolution is to announce results of questionable polls it claims were taken at major scientific institutions.

At least that's what IDnet-NM (www.nmidnet.org), the New Mexico branch of the pro-creationist Intelligent Design Network, Inc., tried this summer. But it got caught with its polls down.

In its many attempts to influence members of the State Board of Education, IDnet-NM sent a news release to board members on July 28 announcing the results of supposed polls it said represented attitudes of local scientists concerning the teaching of evolution and intelligent design in New Mexico's schools.

It claimed the overwhelming majority of respondents, including scientists at two national laboratories in New Mexico, "favored teaching the evidence both for and against evolution by a factor of 4-to-1." It also claimed that they "favored teaching intelligent design by an overwhelming factor of 5-to-1."

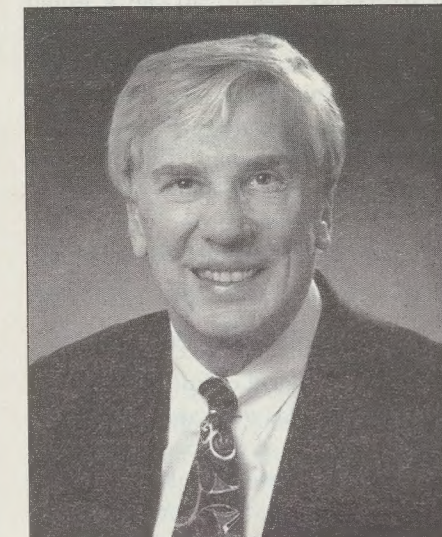
It said its online survey was sent to "approximately 16,000 employees of Sandia and Los National Labs" and 500 science and engineering faculty members at three universities in New Mexico.

Trouble is, one of the laboratories, strongly miffed by the group's attempt to use its name and prestige to promote the ID cause, fought back—successfully.

Suspensions were first raised when informal questioning of employees found few, if any, who said they had received such a poll. An independent poll of eighty-one employees at Sandia and Los Alamos found that not one had received the IDnet poll at their lab addresses. Many other questions about the poll's validity and claims were soon raised.

Los Alamos decided initially not to respond about the poll.

But Sandia National Laboratories, one of the nation's leading engineering and scientific research laboratories, strongly disputed both the poll and the news release. Sandia issued a statement calling the poll "bogus" and said it "has no scientific validity."



C. Paul Robinson

The statement came directly from Sandia's president and director, C. Paul Robinson. Robinson is a physicist and a respected national leader in science and technology and in defense policy. He's a member of the National Academy of Engineering and a 2003 recipient of the American Physical Society's Pake prize. He also carries the rank of Ambassador; he headed the American delegation to the US/USSR nuclear testing talks in Geneva that led to protocols to the Threshold Test Ban Treaty.

When informed about the poll announcement and the way it was being used to persuade Board of Education members to dilute New Mexico's much-praised new draft science content standards for public school education, Robinson looked into the matter. He then prepared a strong statement refuting the IDnet assertions.

Here is complete text of Robinson's statement:

A recent news release issued by the Intelligent Design Network indicated Sandia's 8,000 employees were among 16,000 people surveyed about the issue of teaching creationism along with evolution in New Mexico schools. This release was very misleading. No such survey took place among Sandia's 8,000 employees.

When we looked closely into this claim, we learned that of the 16,000 people at Sandia, Los Alamos, and the three New Mexico state universities who we understand purportedly were given an opportunity to participate, only 248 people actually chose to participate in such a survey. We have no idea how these individuals were selected.

A sample this small, from such a large population, has no scientific validity and should not be used to imply Sandia National Laboratories or its employees endorse the Intelligent Design Network's ideas. I am disappointed that the Intelligent Design Network chose to include Sandia National Laboratories in a news release based upon a bogus mini-survey.

As one of the world's leading engineering and science laboratories, we at Sandia are very careful to apply accepted scientific methods to all surveys in which we participate. That is not the case with the survey in question. We did not participate in the Intelligent Design Network's survey and do not support its conclusions.

As soon as the statement was completed, on August 13, physicist Marshall Berman, a former Sandia department manager and a former member of the State Board of Education, immediately sent it, as was Sandia's intention, to all current board members and to officials in the governor's office. Berman had been instrumental in reversing the 1997 victory of creationists in New Mexico. After they stacked the board of education, he ran for election to it on a strong pro-science stance, was elected, and led successful efforts to restore evolution

and other related scientific concepts such as the age of the Earth to state science teaching standards (see David E. Thomas, "Science Trumps Creationism in New Mexico," *SKEPTICAL INQUIRER*, January/February 2000).

Prior to the Sandia statement, the *SKEPTICAL INQUIRER* sent an e-mail request to Joe Renick, executive director of IDnet-New Mexico, asking if he would answer some questions about the poll and IDnet's news release. Renick never replied.

On August 17, *Albuquerque Journal* science writer John Fleck reported on the Sandia statement. In an article headlined "Anti-Evolution Poll Called Bogus," Fleck quoted extensively from the Sandia statement about the poll's shortcomings. Fleck also reported that as a result of the statement, Renick said his organization planned to stop using the poll, saying, "It is turning into a distraction."

Renick told the *Journal* that he never intended to suggest that the lab survey's results were representative of all the employees of Sandia and the other scientific institutions. "It should not be interpreted as representative," Renick said.

But Fleck pointed out that IDnet's July 28 news release claimed that the poll "could be important in convincing the State Board of Education that the current language developed by the Department of Education does not reflect the general attitudes of parents of school children in New Mexico or that of scientists in New Mexico's national labs." IDnet was caught in a self-contradiction.

Later, on August 19, IDnet's Renick sent still another letter, this one stunning for its hypocrisy, to all fifteen members of the Board. Renick again defended the poll and said criticisms of it were "misinformed." But, he said, "IDnet will make no further use of the results of this survey." He acknowledged that "some will take that as an admission to the charges of fraud. So be it." But then he immediately disputed that interpretation and again repeated the poll's supposed results and reasserted his claims that "the results of the laboratory

survey are an interesting indicator of the attitudes of scientists in the national labs." And he concluded with the creationist assertion that the science standards, by including evolution, "compromise the integrity of science."

IDnet then published a full-page paid ad in the August 24 *Albuquerque Journal* repeating its arguments. It gave "A Scientific Dissent from Darwinism" and included a chart of results of the supposed poll that it had said it would make no more use of.

New Mexico scientists battled back. In an op-ed column in the *Albuquerque Journal* titled "Creationists Tainting Real Science," M. Kim Johnson, president of the New Mexico Academy of Science, referred extensively to the Sandia statement and said "the misleading use of the bogus poll by IDnet is not simply an isolated mistake, although it is a mistake," but is an attempt "to deceive the public and the State Board of Education. . . ."

Other scientists wrote and e-mailed the board in support of the science standards. Biology department faculty from the University of New Mexico forwarded to all board members the new Botanical Society of America statement on evolution (see page 12). All this was to help counter the massive campaign mounted by the IDnet, which was bombarding Board members with appeals to alter the standards.

Los Alamos also then joined the fight. Los Alamos National Laboratory Director G. Peter Nanos sent a letter directly to Renick, with copies to the head of the State Department of Education and the New Mexico Board of Education.

"The claims made in that [July 28] news release are misleading," said Nanos's letter. "There is no evidence that all of our scientific and technical staff members received the so-called 'poll,' nor is there assurance that those who responded were actually scientific or technical staff members. The 'results' come from less than one percent of the total employee base, hardly a response rate that can purport to represent the opinions of 'all scientists' at this institution."

"I would appreciate it if you would refrain from associating the name of Los Alamos National Laboratory with your effort in any and all materials."

On August 27, the Board's Instructional Services Committee met in Santa Fe to consider the science standards. For once, audience members in favor of adopting the standards without change outnumbered the IDnet supporters, and many of them spoke, including scientific leaders and a representative of the New Mexico Council of Churches.

According to a report on the meeting written that night by Marshall Berman, "Members of the audience who hadn't spoken were asked to stand and identify themselves. About 90-95 percent of the audience favored adopting the standards as is, and they came from all over the state. It was an amazing sight."

The committee voted to endorse the standards by a 4-2 vote. The next day the full board voted unanimously, 13-0, to accept the standards as is. Berman reports that the IDnet people tried dirty tricks up to the end—wrongly claiming that the new standards allow discussions of ID, for example—but the board would have none of it. The 2003 battle was won.

On September 5 the New Mexico Department of Education capped the matter. It issued a news release proudly announcing that leading outside science organizations and experts were calling the board's newly adopted science standards "truly excellent," "clearly among the best in the nation, if not the best," and "an accurate representation of the best science."

IDnet's attempts to (mis)use a poll backfired this time. But it took a strong, even courageous reaction from the distinguished director of a major national scientific institution (followed by an equally strong letter from the director of another)—and aggressive follow-up actions by many other pro-science activists—to refute the effects of the poll announcement. Opponents of evolution will surely try the same tactic again, in other states. The warning remains: Defenders of science must speak out.

The good news: Speaking out can have strong, positive effects on behalf of good science.

See also Chris Mooney, "Polling for ID," on the CSICOP Web site at www.csicop.org/doubtandabout/polling/.

Kendrick Frazier is Editor of the *SKEPTICAL INQUIRER*.

Evolution Battle in Texas Textbooks

In September 2003, a crowd packed a Board of Education hearing on the selection of biology textbooks in Austin, Texas. The topic of contention was, of course, evolution. More than 160 people signed up to speak in front of the board at the September 10 meeting. Among them were officials from the Seattle-based creationist group Discovery Institute. The board voted 10 to 3 not to let the out-of-state witnesses testify during the hearing. They were, however, allowed to make presentations to the board members after the hearing adjourned and to submit written testimony.

William Dembski, Baylor professor and Senior Fellow at the Discovery Institute, misrepresented scientific opposition of evolution while speaking to the Associated Press. "There is considerable debate in scientific circles about the mechanism of evolution, namely how it happened," Dembski said, quoted in a September 11 news story on the hearing. "All the textbooks under consideration grossly exaggerate the evidence for neo-Darwinian evolution, pretending that its mechanism of natural selection acting on random genetic change is a slam dunk. Not so."

Many groups and individuals voiced their support for quality science education, including members of National Center for Science Education, Texas Citizens for Science, the Texas Freedom Network, scientists from the University of Texas at Austin (including CSICOP

Fellow Steven Weinberg), educators, concerned parents, clergy, and other citizens from around the state.

Texas is the second largest textbook market in the country, surpassed only by California. Changes made by publishers because of decisions in these two states often influence textbooks across the United States. For this reason the Discovery Institute and other enemies of science education are eager to influence these school boards. The approved textbooks will be announced on November 7.

—Kevin Christopher

Kevin Christopher is Public Relations Director for CSICOP.

Extensive Loch Ness Search by BBC Team Yields No Monster

In July 2003, a team commissioned by the British Broadcasting Corporation to search Loch Ness for its fabled monster concluded that Nessie could not be found.

Though the lake has been searched

repeatedly over the past seventy years, the investigation is the most thorough to date. The BBC team surveyed the waters using 600 separate sonar beams, and used a satellite navigation system to make sure that the entire lake was searched.

Ian Florence, one of the experts who participated in the investigation, was emphatic that the lake holds no monsters. "We went from shoreline to shoreline, top to bottom on this one, we have covered everything in this loch and we saw no signs of any large living animal in the loch." Another investigator, Hugh MacKay, told the BBC that, far from being skeptical, the team began the search expecting to find the creature. "There was an anticipation that we would come up with a large sonar anomaly that could have been a monster, but it wasn't to be."

It is important to note that for the creature to exist, there would have to be a breeding population of the monsters—perhaps a dozen or more. Out of all those giants supposedly swimming in the loch, not even one was found.

Having failed to find Nessie, the BBC team explained why people



Self-proclaimed white witch Kevin Carlyon stands by a statue of the Loch Ness monster as he performs an invocation on the banks of Loch Ness in an attempt to summon the monster, June 13, 2003. A British Broadcasting Corporation (BBC) team had earlier searched the lake for the creature. Both Carlyon and the BBC failed to find Nessie. Reuters/Jeff J. Mitchell

continue to see monsters where there apparently aren't any: witnesses see what they want to see. As an experiment, the researchers hid a fence post beneath the waterline and raised it in front of a party of tourists to see how they would interpret what they saw. When asked to describe what they had seen, several drew monster-shaped heads instead of the actual square post. Expectation influences observation, and clearly the suggestion that lake creatures might be lurking in the deep waters can transform mundane objects into monsters.

Interest in the Loch Ness monster was fueled earlier in July 2003 when a fossil vertebrae said to be of a plesiosaur (an extinct animal thought to be a possible candidate for Nessie) was found along the shores of the loch. In late July *National Geographic News* reported that scientists had concluded that the fossil find was a hoax. It was a legitimate fossil, all right—but not from Loch Ness. The fossil was embedded in limestone, which is not found in the area. Most likely, says National Museum of Scotland paleontologist Lyall Anderson, the fossil was planted there to be later discovered and touted as part of a Nessie skeleton. (One of the arguments against the existence of lake monsters is the total absence of bones or skeletons.) Even the president of the local Nessie fan club admitted it was almost certainly a hoax.

The BBC report has angered many around Loch Ness, which is economically dependent on tourism. Some residents are afraid that fewer visitors will come to the lake if the monster is revealed not to exist. The findings will be broadcast later this year in a program titled "Searching For the Loch Ness Monster." Despite the new findings, of course, the sightings and search will continue.

—Benjamin Radford

Benjamin Radford wrote on the Lake Champlain monster in the July/August 2003 issue of *SKEPTICAL INQUIRER*.

Polygraph Testing to Be Scaled Back at National Labs

The U.S. Department of Energy (DOE) has mostly reversed its controversial earlier stand about polygraph testing and now will recommend a vastly scaled down program of mandatory polygraph exams at the three national laboratories that deal with nuclear weapons.

In a preliminary decision announced June 13, 2003, DOE ignored strong National Academy of Sciences criticisms about polygraph testing and said it would continue the full-fledged program as is (News & Comment, July/August 2003). The decision stunned many.

But now Deputy Energy Secretary Kyle McSlarrow has completed a full review of the issue. In a 29-page statement to a Senate committee on September 4 he announced that he had found the October 2002 NAS report persuasive, which he called "a study of considerable rigor and integrity," and as a result would recommend retaining a mandatory polygraph screening program "only for individuals with regular access to the most sensitive information."

The new approach would reduce the number of people affected from well in excess of potentially 20,000 to approximately 4,500.

However, he also said he recommends starting a small new program of random screening of an additional population of individuals in the weapons complex who have somewhat lesser access to classified information. Only a small percentage of the some 6,000 individuals in that category would be polygraphed in any given year.

Many details still need to be worked out. Publication of a formal rule is expected by the end of the year.

Outside observers welcomed the scaled down mandatory program, but many questioned whether the DOE action went far enough.

"It's still a voodoo test," said the former head of union of scientists at Lawrence Livermore National Labora-

tory. Sen. Jeff Bingaman, D-New Mexico, who had requested the NAS study, said even the new, reduced program would produce about 800 "false positives." Said Bingaman: "I think you have many Americans who have other options than having their patriotism questioned and being hooked up to a machine to determine their loyalty." Rep. Ellen Tauscher, D-California, said she was relieved by the new policy, "But I remain deeply concerned that a dangerous gap between science and the policy remains." Continuing to subject thousands of lab employees to polygraphs, she said, "only promotes a false sense of security and does nothing to foster good science at our national labs."

—K. F.

Scott Peterson Defense Suggests Satanists

Scott Peterson, a fertilizer salesman who is accused of killing his pregnant wife Laci in December of 2002, is bringing up the spectre of Satanism in his defense. The photogenic Modesto, California, mother was found washed up on a San Francisco shore.

The legal team for Peterson reportedly plans to put forth the theory that Laci was kidnapped and killed in some sort of Satanic ritual as a sacrifice. Randy Cerny, an "expert" on ritualistic crimes, is expected to testify, in part because of his involvement with another alleged Satanic killing case, that of four people in nearby Salida, California, in 1990. Angela Ragsdale, another self-styled Satanic ritual expert, noted unconfirmed reports that Laci's unborn child's body allegedly was found with a slash on the torso and a nooselike length of tape wrapped around the neck. This detail, Ragsdale said, suggests "a satanic-type thing." Other claimed links include the time of year Peterson was killed (supposedly coinciding with an important Satanic date), and the (possibly erroneous) detail that Laci's internal organs were removed.

Throughout the 1980s and early 1990s, a rash of child abuse cases horrified

America. Children accused adults of ritual rapes, torture, and abuse, and the news media reported the lurid stories with glee. Often the accusations included charges of Satanism. Though some media reports were carefully researched and stuck to the facts, most were heavily sensationalized. The pinnacle was perhaps Geraldo Rivera's infamous NBC special "Devil-Worship: Exposing Satan's Underground," which aired on October 28, 1988.

On the special (as well as in his syndicated talk show), Rivera mixed together a stew of self-proclaimed "Satanism experts," misleading and inaccurate statistics, crimes with only tenuous links to Satanism, and sensationalized media reports. What came out was a rancid yet irresistible two hours that garnered the largest viewership for a documentary in television history—though "documentary" is perhaps giving it too much credit. Rivera did his best to whip up emotions, paranoia, and fear, claiming that an organized, Satanic conspiracy was at work killing babies, murdering innocents, conducting ghastly rituals, and having orgies, all to appease evil incarnate, Satan. The notable lack of evidence for the Satanic crimes was seen not as a reason to question the claims, but simply as proof of how well organized and shrewd the Satanic conspiracy really had become.

Little evidence supports claims of Satanic cults. According to Jeffrey Victor, author of *Satanic Panic: The Creation of a Contemporary Legend*, "There are no Satanic cults as organizations, not even as minuscule groups." In a 1992 report on ritual crime, FBI agent Kenneth Lanning concluded that the rampant rumors of ritual murders, cannibalism, and kidnapping were unfounded. Phillips Stevens, Jr., associate professor of anthropology at the State University of New York at Buffalo, said that "In 1991, after more than ten years of patiently suggesting sociopsychological explanations for the tens of thousands of allegations of horrible deeds by Satanic cults, I lost my patience and in an article in the *Wayne County (New York) Times* (October 8), I declared that such allega-

tions constitute 'the greatest hoax perpetrated upon the American people in the twentieth century.'"

Twenty years after the hysteria and panic, Scott Peterson and his lawyers are trying to revive the Satanic spectre. Whether the Satanism story is found credible or not may reveal how well Americans learned their lessons.

—B. R.

Astrologer Misses John Ritter's Death

It must be the ultimate embarrassment for an astrologer: publish in a newspaper a glowing horoscope about a celebrity hours after that celebrity has suffered a tragic and premature death.

That's what happened to newspaper astrologer Joyce Jillson. Jillson's "Your



Actor John Ritter

Stars" syndicated column appeared in the *New York Daily News* and other newspapers on September 12, 2003, with a mini-profile of actor television John Ritter. Unfortunately, Ritter, 54, had collapsed on the set of his TV show *Eight Simple Rules For Dating My Teenage Daughter* Sept. 11 and died of a torn aorta in a Burbank, California, hospital shortly after 10 P.M. that same night.

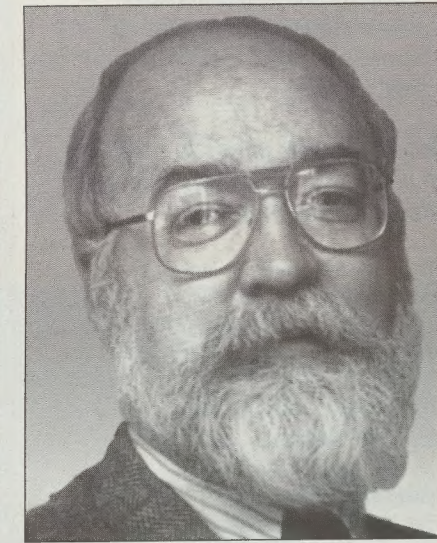
"John Ritter is a lovable character..." Jillson's Sept. 12 column item began. "Having a Virgo sun sign helps keep his career ticking."

—K. F.

Daniel Dennett Elected a CSICOP Fellow

Daniel C. Dennett, author of *Darwin's Dangerous Idea* (1995) and the new book *Freedom Evolves* (Viking Penguin 2003), has been recently elected a Fellow of the Committee for the Scientific Investigation of Claims of the Paranormal (CSICOP).

A leading philosopher of the mind, Dennett is Director of the Center for Cognitive Studies and University Professor and Austin B. Fletcher Professor



Daniel C. Dennett

of Philosophy at Tufts University, Medford, Massachusetts.

Dennett's other books include *Content and Consciousness*, *Brainstorms*, *Consciousness Explained*, *Kinds of Minds*, and *Brainchildren: A Collection of Essays*. He co-edited *The Mind's I* with Douglas Hofstadter.

A Boston native, Dennett received his B.A. in philosophy from Harvard and his Ph.D. in philosophy from Oxford

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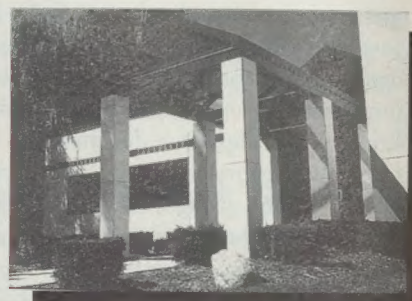
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NEWS AND COMMENT

University. He taught at UC Irvine from 1965 to 1971, when he moved to Tufts, where he has taught ever since.

Autistic Boy Killed During Exorcism

The Committee for the Scientific Investigation of Claims of the Paranormal (CSICOP) has been following the latest case of an exorcism-related death at the Faith Temple Church of the Apostolic Faith in Milwaukee, Wisconsin. On Friday, August 22, 2003, eight-year-old Terrance Cottrell, Jr., who suffers from autism, was wrapped in sheets and held down by church members during a prayer service held to exorcise the evil spirits they blamed for his condition.

According to the *New York Times*, "[h]is shirt was drenched in sweat when the church members who were holding him down, saying they wanted to rid him of demons, finally noticed that he was dead. He had urinated on himself, and his small, brown face had a bluish cast."

According to the medical examiner, there was extensive bruising on the back of the little boy's neck and it appeared that he died of mechanical asphyxiation from pressure placed on his chest. Pat Cooper, the boy's mother, told investigators that she held down one of Terrance's feet, while other women held down other parts of his body. Ray Anthony Hemphill, the preacher who led the spiritual healing service, held the boy's head and body down. Cooper said Hemphill's knee was pressed into the boy's chest at one point, but Hemphill, who weighs nearly 150 pounds, said that he at times lay on top of the boy, chest to chest. About two hours into the praying and the struggling, Hemphill got up but Terrance was still.

Some in Cottrell's Milwaukee community are outraged by the relatively lenient charges Hemphill faces. Though the county medical examiner ruled the boy's death a homicide, Hemphill has been charged only with felony child abuse, and faces a maximum sentence of

five years in prison and five years of court supervision if convicted. No one else was charged.

Prosecutors claim that they could not lay more serious charges without proving that Hemphill was aware that his actions could harm the victim. "That is a subjective test," Milwaukee assistant district attorney Mark Williams told the *Times*. "What matters from a legal sense is what was in his mind when he was doing what he was doing. And in his mind, he was trying to help this child. This wasn't a normal situation."

"How can a child be dead and these people get charged with child abuse?" asked Mary Luckett, Cottrell's grandmother. "I can't even understand what these people are thinking. I don't care if it was a church. I don't care what they were trying to do."

This tragic exorcism death received a few days' coverage in the week following Cottrell's death, yet the mainstream media have failed to report that such deaths are nothing new. In the past eight years, there have been at least four other exorcism-related deaths in the United States, two of the victims children:

1995, San Francisco, California: Members of Jesus-Amen Ministries pummeled Kyung-A Ha to death as

they tried to drive out her demons.

1996, Glendale, California: A fifty-three-year-old Korean woman died from "blunt force trauma" suffered during an exorcism. Her minister husband and two other males, one a Deacon at Glendale Korean Methodist Church, beat her with their fists and feet for several hours, trying to drive "the devil" out of her. She had consented to the exorcism.

1997, Bronx, New York: A five-year-old girl died after her mother and grandmother forced her to drink a lethal cocktail containing ammonia, vinegar, and olive oil and then bound and gagged her with duct tape. The two women claimed that they were merely trying to poison a demon that had infested the little girl several days earlier.

1998, Sayville, New York: Charity Miranda, seventeen, was suffocated with a plastic bag by her mother and her sister in an effort to destroy a demon inside her. The death came following hours of attempts to rid her of demons.

And now the tragic case of Terrance Cottrell, who died horribly because of a church whose congregation failed to exorcise itself of irrational beliefs.

—K. C. □

Recent Deaths

Albert R. (Al) Hibbs, retired space scientist with the Jet Propulsion Laboratory, first chief of JPL's Space Science Division, "the voice of JPL" for the Ranger, Surveyor, Mariner, Mercury, Viking, and Voyager unmanned planetary missions, winner of NASA's Exceptional Service Award, co-author with Richard Feynman of *Quantum Mechanics and Path Integrals* and author of the introduction to Feynman's *Surely You're Joking, Mr. Feynman*, and CSICOP Fellow, of complications following heart surgery, on February 24, 2003, at age 78.

Ernest H. Taves, psychoanalyst turned writer of fiction and skeptical nonfiction, researcher into parapsychology and visual perception, author of *Trouble Enough: Joseph Smith and the Book of Mormon* (Prometheus 1999) and co-author with the noted Harvard astronomer Donald H. Menzel of *The UFO Enigma* (Doubleday 1977, one of the best early books critically examining both the physical and psychological aspects of the UFO phenomenon), practiced psychiatry and psychoanalysis in New York City and Cambridge, Mass., a CSICOP Scientific Consultant, August 16, 2003, in Boston, of complications following a heart attack, at age 87.

—K. F.

Botanical Society of America's Statement on Evolution

The Botanical Society of America exists to promote botany, the field of basic science dealing with the study and inquiry into the form, function, diversity, reproduction, evolution, and uses of plants and their interactions within the biosphere. Our membership largely consists of professional scientists, scholars, and educators from across the United States and Canada, and from over 50 other countries. Most of us call ourselves botanists, plant biologists, or plant scientists, and members of our profession teach and learn about botanical organisms using well-established principles and practices of science. As such, we were asked by the National Center for Science Education (NCSE) if we could provide a statement outlining our view on evolution. On July 27, 2003, at the 2003 Annual General Meeting the BSA Council approved the statement to follow for use by the NCSE. [Published in the SKEPTICAL INQUIRER by permission of the BSA.]

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Evolution represents one of the broadest, most inclusive theories used in pursuit of and in teaching this knowledge, but it is by no means the only theory involved. Scientific theories are used in two ways: to explain what we know, and to pursue new knowledge. Evolution explains observations of shared characteristics (the result of common ancestry and descent with modification) and adaptations (the result of natural selection acting to maximize reproductive success), as well as explaining pollen: ovule ratios, weeds, deceptive pollination strategies, differences in sexual expression, dioecy, and a myriad of other biological phenomena. Far from being merely a speculative notion, as

implied when someone says, "evolution is just a theory," the core concepts of evolution are well documented and well confirmed. Natural selection has been repeatedly demonstrated in both field and laboratory, and descent with modifi-

they were created just so, and they exhibit the hallmarks of intelligent design. As such, creationism is an all-inclusive explanation for every biological phenomenon. So why do we support and teach evolution and not creationism/"intelligent design" if both explain the same phenomena? Are botanists just dogmatic, atheistic materialists, as some critics of science imply? Hardly, although scientists are routinely portrayed by creationists as dogmatic. We are asked, "Why, in all fairness, don't we teach both explanations and let students decide?"

The fairness argument implies that creationism is a scientifically valid alternative to evolution, and that is not true. Science is not about fairness,

and all explanations are not equal. Some scientific explanations are highly speculative with little in the way of supporting evidence, and they will stand or fall based upon rigorous testing. The history of science is littered with discarded explanations, e.g., inheritance of acquired characters, but these weren't



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cation is so well documented that scientists are justified in saying that evolution is true.

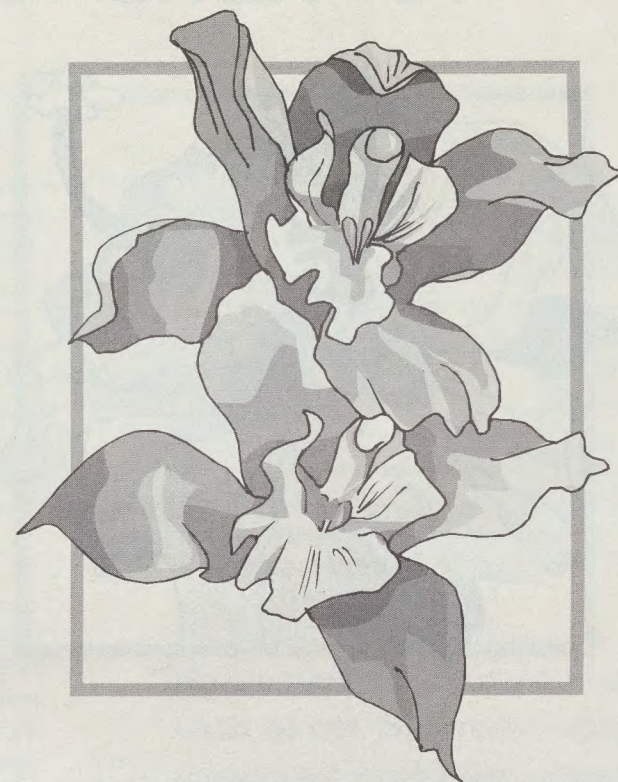
Some people contend that creationism and its surrogate, "intelligent design," offers an alternative explanation: that organisms are well adapted and have common characteristics because

discarded because of public opinion or general popularity; each one earned that distinction by being scientifically falsified. Scientists may jump on a "bandwagon" for some new explanation, particularly if it has tremendous explanatory power, something that makes sense out of previously unexplained phenomena. But for an explanation to become a mainstream component of a theory, it must be tested and found useful in doing science.

To make progress, to learn more about botanical organisms, hypotheses, the subcomponents of theories, are tested by attempting to falsify logically derived predictions. This is why scientists use and teach evolution; evolution offers testable explanations of observed biological phenomena. Evolution continues to be of paramount usefulness, and so, based on simple pragmatism, scientists use this theory to improve our understanding of the biology of organisms. Over and over again, evolutionary theory has generated predictions that have proven to be true. Any hypothesis that doesn't prove true is discarded in favor of a new one, and so the component hypotheses of evolutionary theory change as knowledge and understanding grow. Phylogenetic hypotheses, patterns of ancestral relatedness, based on one set of data, for example, base sequences in DNA, are generated, and when the results make logical sense out of formerly disparate observations, confidence in the truth of the hypothesis increases. The theory of evolution so permeates botany that frequently it is not mentioned explicitly, but the overwhelming majority of published studies are based upon evolutionary hypotheses, each of which constitutes a test of an hypothesis. Evolution has been very successful as a scientific explanation because it has been useful in advancing our understanding of organisms and applying that knowledge to the solution

of many human problems, e.g., host-pathogen interactions, origin of crop plants, herbicide resistance, disease susceptibility of crops, and invasive plants.

For example, plant biologists have long been interested in the origins of crop plants. Wheat is an ancient crop of the Middle East. Three species exist both as wild and domesticated wheats,



einkorn, emmer, and breadwheat. Archeological studies have demonstrated that einkorn is the most ancient and breadwheat appeared most recently. To plant biologists this suggested that somehow einkorn gave rise to emmer, and emmer gave rise to breadwheat (an hypothesis). Further evidence was obtained from chromosome numbers that showed einkorn with 14, emmer with 28, and breadwheat with 42. Further, the chromosomes in einkorn consisted of two sets of 7 chromosomes, designated AA. Emmer had 14 chromosomes similar in shape and size, but 14 more, so they were designated AABB.

Breadwheat had chromosomes similar to emmer, but 14 more, so they were designated AABBCC. To plant biologists familiar with mechanisms of speciation, these data, the chromosome numbers and sets, suggested that the emmer and breadwheat species arose via hybridization and polyploidy (an hypothesis). The Middle Eastern flora was studied to find

native grasses with a chromosome number of 14, and several goatgrasses were discovered that could be the predicted parents, the sources of the BB and CC chromosomes. To test these hypotheses, plant biologists crossed einkorn and emmer wheats with goatgrasses, which produced sterile hybrids. These were treated to produce a spontaneous doubling of the chromosome number, and as predicted, the correct crosses artificially produced both the emmer and breadwheat species. No one saw the evolution of these wheat species, but logical predictions about what happened were tested by recreating likely circumstances. Grasses are wind-pollinated, so cross-pollination between wild and cultivated grasses happens all the time. Frosts

and other natural events are known to cause a doubling of chromosomes. And the hypothesized sequence of speciation matches their observed appearance in the archeological record. Farmers would notice and keep new wheats, and the chromosome doubling and hybrid vigor made both emmer and breadwheat larger, more vigorous wheats. Lastly, a genetic change in breadwheat from the wild goatgrass chromosomes allowed for the chaff to be removed from the grain without heating, so gluten was not denatured, and a sourdough (yeast infected) culture of the sticky breadwheat flour

would inflate (rise) from the trapped carbon dioxide.

The actual work was done by many plant biologists over many years, little by little, gathering data and testing ideas, until these evolutionary events were understood as generally described above. The hypothesized speciation events were actually recreated, an accomplishment that allows plant biologists to breed new varieties of emmer and bread wheats. Using this speciation mechanism, plant biologists hybridized wheat and rye, producing a new, vigorous, high protein cereal grain, Triticale.

What would the creationist paradigm have done? No telling. Perhaps nothing, because observing three wheat species specially created to feed humans would not have generated any questions that needed answering. No predictions are made, so there is no reason or direction for seeking further knowledge. This demonstrates the scientific uselessness of creationism. While creationism explains everything, it offers no understanding beyond, "that's the way it was created." No testable predictions can be derived from the creationist explanation. Creationism has not made a single contribution to agriculture, medicine, conservation, forestry, pathology, or any other applied area of biology. Creationism has yielded no classifications, no biogeographies, no underlying mechanisms, no unifying concepts with which to study organisms or life. In those few instances where predictions can be inferred from Biblical passages (e.g., groups of related organisms, migration of all animals from the resting place of the ark on Mt. Ararat to their present locations, genetic diversity derived from small founder populations,

dispersal ability of organisms in direct proportion to their distance from eastern Turkey), creationism has been scientifically falsified.

Is it fair or good science education to teach about an unsuccessful, scientifically useless explanation just because it pleases people with a particular religious belief? Is it unfair to ignore scientifically useless explanations, particularly if they



have played no role in the development of modern scientific concepts? Science education is about teaching valid concepts and those that led to the development of new explanations.

Creationism is the modern manifestation of a long-standing conflict between science and religion in Western Civilization. Prior to science, and in all non-scientific cultures, myths were the only viable explanations for a myriad of natural phenomena, and these myths became incorporated into diverse religious beliefs. Following the rise and spread of science, where ideas are tested against nature rather than being decided by religious authority and sacred texts, many phenomena previously attributed

to the supernatural (disease, genetic defects, lightning, blights and plagues, epilepsy, eclipses, comets, mental illness, etc.) became known to have natural causes and explanations. Recognizing this, the Catholic Church finally admitted, after 451 years, that Galileo was correct; the Earth was not the unmoving center of the Universe. Mental illness, birth defects, and disease are no longer considered the mark of evil or of God's displeasure or punishment. Epileptics and people intoxicated by ergot-infected rye are no longer burned at the stake as witches. As natural causes were discovered and understood, religious authorities were forced to alter long-held positions in the face of growing scientific knowledge. This does not mean science has disproved the existence of the supernatural. The methodology of science only deals with the material world.

Science as a way of knowing has been extremely successful, although people may not like all the changes science and its handmaidens, technology, have wrought. But people who oppose evolution, and seek to have cre-

ationism or intelligent design included in science curricula, seek to dismiss and change the most successful way of knowing ever discovered. They wish to substitute opinion and belief for evidence and testing. The proponents of creationism/intelligent design promote scientific ignorance in the guise of learning. As professional scientists and educators, we strongly assert that such efforts are both misguided and flawed, presenting an incorrect view of science, its understandings, and its processes.

Authored by: J. E. Armstrong and J. Jernstedt, officers of the BSA. Approved by the BSA Council: July 27, 2003. Copyright ©2003 The Botanical Society of America. P.O. Box 299, St. Louis, MO 63166-0299. Web site: www.botany.org. □



INVESTIGATIVE FILES

JOE NICKELL

The Curse of Bodie: Legacy of Ghost-Town Ghosts?

Today, the ghost town of Bodie, California, is one of the most authentic abandoned gold-mining towns of the Old West (figure 1). It is also reputed to be a "ghost" town in another sense: Some claim, according to a TV documentary, that Bodie is inhabited by ghosts who guard the town against pilferers (*Beyond* 2000). Supposedly, a visitor who dares to remove any artifact can be plagued by the dreaded "curse of Bodie."

Boom Town

The 1849 discovery of gold at Sutter's Mill in the western Sierra foothills lured men and women to California from across the United States and indeed the world. Prospectors equipped with picks, shovels, and the ubiquitous gold pans searched for placer deposits—loose flakes and nuggets that have eroded and washed into streams.

These deposits were searched for by "panning" (an art I once learned in the Yukon) in which the lighter dirt is deftly washed out, leaving behind the flakes of "color" that are collectively called "gold dust." The discovery of sufficient placer deposits sparked quests for the "mother lode," involving hardrock mines laboriously dug, blasted, and shored up with timber (Williams 1992, 5; Smith 1925).

A decade after the gold rush began at Sutter's Mill, four prospectors made a rich strike on the opposite side of the Sierras—that is, in the eastern foothills.

They agreed to keep the discovery secret until the following spring, but one, W.S. Bodey, returned with another man, a half-Cherokee named "Black" Taylor. Having traveled to Monoville for supplies, the pair were returning to their cabin when they were caught in a blizzard and Bodey perished.

Named for its discoverer, camp Bodey was soon rechristened "Bodie" when (according to local lore) a sign painter misspelled the word and the new version was preferred (*Bodie* 2001;

Mine, which, in just six weeks, shipped gold bullion worth a million dollars. Meanwhile, Bodie grew rapidly, with boarding houses, restaurants, saloons, and other enterprises springing up (Williams 1992, 9–10).

Camps like Bodie attracted a breed of adventurous types:

Besides the business and professional men, mine-operators, miners, etc., there were hundreds of saloon-keepers, hundreds of gamblers, hundreds of prostitutes, many Chinese, a con-

"[Bodie had] an unusual number of what we used to call 'Bad men'—desperate, violent characters from everywhere, who lived by gambling, gun-fighting, stage robbing, and other questionable means."

Misspelling 2003). At first Bodie was largely neglected due to other strikes in the area. Mark Twain was among the gold seekers who rushed to nearby Aurora, Nevada, for instance.

However, Bodie eventually boomed. In 1876, a freak mine cave-in exposed a valuable body of gold, and the Standard Consolidated Mining Company responded with a large investment in equipment and lumber. Another rich strike followed in 1878 in the Bodie

siderable number of Mexicans, and an unusual number of what we used to call "Bad men"—desperate, violent characters from everywhere, who lived by gambling, gun-fighting, stage robbing, and other questionable means. The "Bad man from Bodie" was a current phrase of the time throughout the west. In its day, Bodie was more

Joe Nickell is CSICOP's Senior Research Fellow and author of numerous investigative books including *Real-Life X-Files*.

widely known for its lawlessness than for its riches. (Smith 1925)

There were other perils and hardships, including the savage winter of 1878–1879 in which hundreds died of exposure and disease, and mining accidents that claimed victims by falling timber, the explosion of a powder magazine, and other means (Smith 1925; *Bodie Cemetery* n.d.).

Given Bodie's reputation, it is perhaps not surprising that one little girl, whose family was moving to the mining town, reportedly prayed: "Goodbye God! We are going to Bodie" (Smith 1925).

Decline

Hardships and violence aside, Bodie was a thriving, bustling place, containing some 600 to 800 buildings and a population that reached over 10,000 (Williams 1992, 10; Johnson and Johnson 1967, 20). As it appeared about 1880,

The traffic in the streets was continuous and enlivening. There were trains of huge, white-topped "prairie-schooners," bringing freight from the railroad, each drawn by twenty or more horses or mules, and pulling one or two large, four-wheeled "trailers"; ore wagons, hauling ore down the canyon to the mills; wood wagons bringing huge loads of pine-nut from long distances, for the mines and mills and for general use; hay wagons, lumber wagons, prospecting outfits, nondescript teams of all descriptions, spanking teams driven by mine superintendents' horses ridden by everybody, and most exciting of all, the daily stages that came tearing into town and went rushing out; the outgoing stages often carrying bars of bullion, guarded by stern, silent men, armed with sawed-off shotguns loaded with buckshot. . . . (Smith 1925)

However, like other boom towns, Bodie's period of glory was brief, lasting from 1879 to 1882. The decline was slow, with the two major mines—the Bodie and the Standard—merging in 1887 and operating successfully for the

next two decades. A disastrous fire struck in 1892 and—with a steady decline in the interim, including additional mine closings and abandonment of the Bodie Railway in 1917—another devastating fire destroyed much of the town in 1932 (Johnson and Johnson 1967, 20–21).

Although Bodie was already dying, further decline having resulted from Prohibition and the Depression, some mining continued. However, there were no new strikes and companies eked out only minor profits, largely by using the cyanide process to extract gold from old



Figure 1. This California ghost town is allegedly haunted by spirits who wield "the curse of Bodie."

tailings (i.e., mine refuse). By the 1950s even this recovery operation ceased and Bodie became a ghost town. Explains one writer: "When people were leaving Bodie, there were no moving companies in the area. People simply packed what they could on one wagon or truck and left the rest behind." He adds, "That is why many of Bodie's buildings still contain belongings that were left here years ago" (Williams 1992, 36).

In 1962, after years of neglect, Bodie became a State Historic Park, and two years later the Ghost Town of Bodie was dedicated as a California Historic Site. It has also been designated a National Historic Site. Bodie is maintained in a state of what is termed "arrested decay," which means the buildings are protected but not restored (Johnson and Johnson 1967, 21; *Bodie* 2001, 3).

Ghost Town, 'Ghost' Town

Old, deserted places inspire the romantic

and the superstitious to think of ghosts, and Bodie is no exception. It represents an entire townful of potentially haunted houses and other premises—168 remaining structures—as well as the Bodie cemetery. It is, gushes one ghost-hustling writer, "A ghost town that is *really* a ghost town" (Myers 1990).

However, the reports of ghostly activity tend to fall into categories of familiar, well-understood phenomena. Consider, for example, occurrences at the J.S. Cain House at the corner of Green and Park streets. Once the home of a prominent businessman and then the residence of caretakers' families, it is supposedly haunted by the specter of a Chinese woman, possibly a maid who worked for the Cains (Hauck 1996).

Reportedly, this "heavy set" Chinese lady appeared to children in their second-floor bedroom. Also, a ranger's wife stated:

I was lying in bed with my husband in the lower bedroom and I felt a pressure on me, as though someone was on top of me. I began fighting. I fought so hard I

ended up on the floor. It really frightened me. Another ranger who had lived there, Gary Walters, had the same experience, in the same room, except that he also saw the door open and felt a presence and a kind of suffocation. (Myers 1990)

All of these effects are well known and may occur when one's consciousness shifts into a state between being fully asleep and fully awake. In this condition, seemingly realistic "waking dreams" often occur, involving ghosts, aliens, or other beings. Also in this interim state one may experience "sleep paralysis" in which, although the mind is awake, the body is still in the sleep mode. The sensation of being held or strapped down is a typical consequence (Nickell 2001).

Some apparitional or auditory experiences such as those reported at Bodie—for example "a woman peering from an upstairs window in the Dechambeau

House" or "the sound of children's laughter . . . heard outside the Mendocini House" (Myers 1990)—may be similarly explained. These typically occur when the experiencer is relaxed or performing routine work. Such a mental state may allow images or sounds to spring up from the subconscious and thus be superimposed upon the consciousness (Nickell 2001).

One man visiting the Bodie cemetery with his little girl noticed her giggling and apparently playing with an unseen entity. This was supposed to be "The Angel of Bodie," a child who was killed when she was accidentally hit in the head by a miner's pick (Myers 1990). Actually the dead child was Evelyn, the three-year-old daughter of Albert and Fannie Myers, who died in 1897. Her grave is surmounted by the figure of a child angel, sculpted of white marble (*Bodie Cemetery* n.d., 5)—an ideal model for a little girl's imaginary playmate (see figure 2).

I have found that some people seem especially susceptible to ghosts—because they are more inclined to believe or because they are especially imaginative. I continue to use a questionnaire that helps me analyze reported ghost encounters, and thus far I find a good correlation between those experiences and the number of traits associated with fantasy proneness (Nickell 2001).

This correlation continued with my research at Bodie, although colleague Vaughn Rees and I obtained only four completed questionnaires there. (A ranger stopped the project since I had not obtained official permission, something I usually try to avoid to keep employees from being told what to say.) Nevertheless, even with this limited sample, the highest ghost-experiences score was matched by a high fantasy score, and similar results were obtained with six questionnaires we obtained at another California ghost town, Calico.

In addition to perceived phenomena, photographs represent another form of "evidence" for alleged ghosts at Bodie. Again, however, there are familiar patterns. For example, streaks of light in some photos (Lundegaard 2002) are consistent with the camera's flash rebounding from something—such as the wrist strap—in front of the lens (Nickell 2001).

Bodie Curse

Yet, if some people are to be believed, there are not only ghosts in the



Figure 2. Investigator Vaughn Rees examines the tombstone of "The Angel of Bodie," reportedly one of the resident ghosts.

windswept town but, purportedly, spirits who are responsible for protecting its treasures by implementing the "Curse of Bodie." Explains the narrator of one television documentary:

Bodie's inhabitants were of hardy stock, fiercely possessive of what they had built in this barren desert, and it is said that the long-dead spirits want to ensure that what they left behind remains intact. According to legend, anyone who removes anything—large or small—from the town is cursed with a string of bad luck. Misfortune and tragedy are heaped upon the victim until the stolen item is returned. Some claim that the ghosts of Bodie patrol the crumbling ruins to guard against thieves. (*Beyond* 2000)

According to park ranger J. Brad Sturdivant, "The curse still exists today." Spooked former visitors often return old

nails and other souvenirs taken from Bodie. While "Most of it comes back in an unmarked box," the ranger states, "We still get letters . . . from people saying, 'I'm sorry I took this, hoping my luck will change'" (*Beyond* 2000).

The earliest use I have found of the phrase "The curse of Bodie" appears in the 1925 reminiscence of a former resident. However, he was speaking of something entirely different, namely what had befallen Bodie and caused its decline. As he wrote: "the curse of Bodie, as it was of 'The Comstock,' was the stock market,

which was manipulated by stock gamblers in San Francisco for their own profit, regardless of the merits of the mines, and without thought for the thousands that found their ruin in the unholy game . . ." (Smith 1925).

The notion of a quite different Bodie curse—one that does not harm the town but instead defends it from pillagers—is of much more recent vintage. Not surprisingly, it appears to follow efforts to preserve Bodie as a historic site. Obviously the "curse" is being officially promoted today when a ranger encourages the idea on a television program and the

museum/gift shop displays an album of letters from those believing themselves accursed.

Although these letters may be only a selection and three are undated, the earliest of the remaining twelve was sent in 1992. Having taken a nail from Bodie, the writer states: "Life since then has been a steady downward slide. It's possible that all the unpleasant events of the past nine months are a coincidence, but just in case the Bodie curse is real I am returning the nail." Another letter, from 1994, is addressed, "Dear Bodie Spirits":

I am SORRY! One year ago around the 4th of July I was visiting the Ghost Town. I had been there many times before but had always followed the regulations about collecting. This trip was different, I collected some items here and there and brought them home. I was a visitor again this year, and while

I was in the museum I read the letters of others who had collected things and had "bad luck." I started to think about the car accident, the lost [sic] of my job, my continuing illness and

curse, a Hope Diamond jinx, or a Kennedy family propensity for misfortune (Nickell 1999).

A different mindset allows one to

the newspaper, *The Bodie Evening Miner*. If it be argued that these were not pilfered from Bodie, the other item, an old fork, reportedly was: I bought it from an antiques dealer who said she picked it up herself at Bodie several years ago without apparent consequence.

I would like to donate these items to Bodie. I am only waiting for the time when the town's custodians officially cease promoting superstition and disclaim the existence of any Bodie curse.

Acknowledgments

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I have even specifically challenged the Curse of Bodie by collecting artifacts that have come from there.

other bad things that have "haunted" me for the past year since my visit and violation. I am generally not superstitious but ... Please find enclosed the collectibles I "just couldn't live without," and ask the spirits to see my regret.

This was signed, "One with a very guilty conscience."

On the TV series *Beyond Bizarre* (2000), a German man related how his uncle had removed a small bottle from Bodie and two days later had a car accident on the Autobahn. The next day his son took the bottle to school to show classmates and on the way home had a bicycle accident. Said the man, "Yes, I do believe in the curse of Bodie."

Belief aside, such anecdotal evidence does not prove the existence of a "curse" (or "hex" or "jinx")—an alleged paranormal attack. Indeed, belief in curses is merely a superstition, a form of magical thinking. Once the idea takes hold, there is a tendency for any harmful occurrence to be counted as evidence for the belief, while beneficial events are ignored. Through the power of suggestion, the magical conviction spreads from person to superstitious person, until many believe, say, in a King Tut's

shrug off such nonsense. Skeptics sometimes hold "Superstition Bashes" during which they break mirrors and challenge

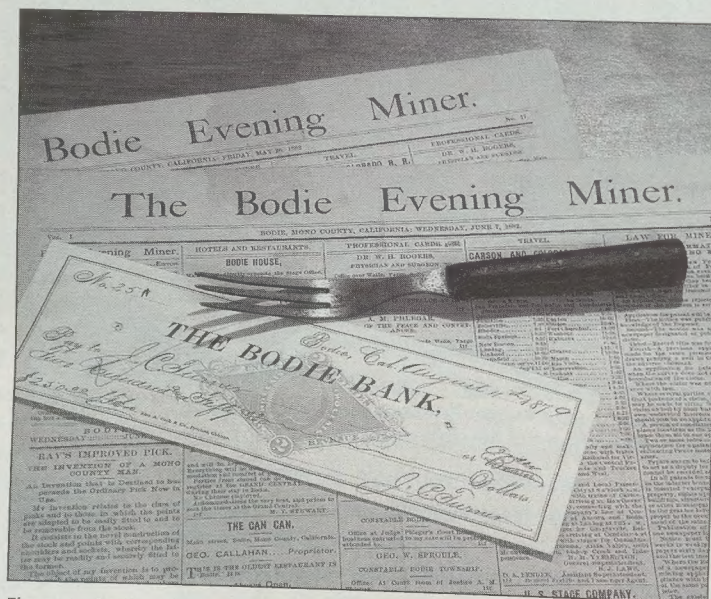


Figure 3. Artifacts from Bodie—especially ones pilfered from there, like this old fork—supposedly attract the fearsome "curse."

other superstitions without fear of consequence. In attendance may be a resident spokesperson (such as myself), identified as a friggatriskaidekaphobiologist—that is, one who studies the fear of Friday the Thirteenth and, by extension, other supposed causes of bad luck.

I have even specifically challenged the Curse of Bodie—not by pilfering items from the site, which is appropriately illegal—but by collecting artifacts that have come from there. As shown in figure 3, these include an 1879 check, drawn on the Bodie Bank, and two 1882 issues of



PSYCHIC VIBRATIONS

ROBERT SHEAFFER

A Quiet Summer in Roswell

So far all the stories we've heard from former military personnel at Roswell, New Mexico, tell of crashed spaceships, frenzied covert activities, and alien cover-ups. But now another voice is heard from the Army Air Corps in Roswell in 1947, and this one tells a very different story from the one we've been hearing on the TV shows. Herbert H. Summer of Pittsburgh, Pennsylvania, now seventy-five, was a strapping youngster of nineteen when he was an Army Air Corps Weather Observer stationed in Roswell from 1946 to August 1947. When I spoke with him, he told me his duties were to make hourly weather observations during an eight-hour shift, record the data, and use it to make up weather maps. Sometimes they sent up weather balloons, occasionally even lighted balloons, although nothing of the scale of the huge Mogul balloon train that is now believed to be responsible for the celebrated Roswell debris (see "The Roswell Incident and Project Mogul" by Dave Thomas, SI July/August 1995). Weather observations were being made around the clock every day at Roswell, but the weather observers reported no saucers—flying, crashing, or otherwise.

The non-sighting of saucers is even more remarkable when you consider the case of the air traffic controllers, who shared a barracks with the weather observers. They manned a small air traffic control tower twenty-four hours a day, although there was very little air traffic going in or out. Thus they had

plenty of time to be on the lookout for strange objects—as they and the weather observers had been warned to be. Summers says that well before the famous "incident," they had been instructed by an officer whose name he believes to have been Capt. Hill, to be on the lookout for "something" strange. They were never told exactly what they were supposed to look for, but they were told if they saw it, they must report it. Perhaps this may have been some officer's over-reaction to the excitement over Kenneth Arnold's first report of "flying disks" on June 24 of that year. Vigilant they were, but neither the weather observers nor the flight controllers ever saw anything to report.

As for the famous "incident" on July 7 (although perhaps "fiasco" would be a better term), while Summer was not involved in the recovery of the so-called "debris," he is confident that it was a balloon. The first he heard about it was when he learned that Major Jesse Marcel "flew off to Ft. Worth carrying a spaceship under his arm," as he now satirically describes it. This agrees well with the statement that Mac Brazel, who first found the debris, made to newspapers: it resembled "tinfoil and sticks," and weighed about five pounds. Summer says that there was no unusual activity at the base immediately following the "incident," and that the stories about the recovery of a spaceship with alien bodies are "all fabrications." In fact, he says that he had hardly thought about the so-called "incident" at all for about

thirty years until he heard the stories being told by Marcel and trumpeted by UFOlogists, turning a minor "incident" into a major "event" and "cover-up."

Summer, who is the father of the composer and Prometheus author Joseph Summer, knew the late Major Marcel quite well, and didn't have good things to say about him. When Marcel picked up the famous "debris," he took it home and attempted to burn it with a match—both of which, as which Summer points out, Marcel had no business doing. If debris of unknown origin is found, it becomes military property and should not be left in a civilian location but immediately brought in for analysis. It should be presumed to have potential intelligence value, and also to be potentially hazardous. It should not be toyed with, which is what Marcel appears to have done, bringing it home and letting his young son handle it.

In fact, Summer goes so far as to describe Marcel as inclined towards "fantasy." When a hoaxer sent a message about a supposed "Russian invasion" across a weather teletype network that was shared by a number of military and university sites, Marcel interrogated Summer for four days over the incident, asking the same questions and receiving the same reply literally hundreds of times. Marcel seemed disappointed, according

Robert Sheaffer's World Wide Web page for UFOs and other skeptical subjects is at www.debunker.com.

to Summer, when a student confessed at one of the university sites. Marcel seemed determined to distinguish himself by finding the originator of the offending message right there in Roswell, whether it originated there or not.

* * *

The recent extra-close approach of Mars (in reality, just a few percent closer than the planet's typical close approach) has

Apparently the first-time circlemakers were not very skillful, because the pilot who discovered the circles said that it looked like "drunk aliens" had created them.

provided plenty of fodder for the cranks and mystery mongers. Chief among them is Richard C. Hoagland, who claims that NASA probes have revealed all kinds of artifacts on that planet (and elsewhere; see www.enterprisemission.com). Referring to his claim that our ancestors originally lived on Mars, he informed a nationwide audience on *Coast to Coast AM* (Art Bell's old show, now hosted by George Noory), "Mars is now almost blinding, it's absolutely breathtaking. . . . Tonight, it's closer than it's been since maybe we were there." But apparently our ancestors on Mars were as careless as some of us have been here on Earth, and somehow destroyed that planet: "When you look at Mars," said Hoagland, "you're seeing a planet where something has gone terribly wrong. I think that going to Mars and finding out that our ancient ancestors somehow blew it, that whatever there is now is in ruins, will have a stunning dramatic effect on the psyche of people here on this planet."

Perhaps that effect has already begun: a story in the *Sydney Morning Herald* of August 28 proclaims "Mars Movements Spark Huge Rise In German 'UFO Sightings'" (see www.smh.com.au/articles/2003/08/27/1061663855310.htm). Werner Walter, the head of CENAP, a group of German UFO skeptics, said "I'm hearing some of the most outrageous claims at the

moment." People have reported "close encounters" with a brilliant orange UFO, one that reportedly maneuvers around following them.

And the research of Hoagland and his colleagues continues to turn up amazing, literally unbelievable facts about Mars. A new analysis of Mars Odyssey frames of the so-called "Mars face" on Cydonia has revealed that that feature is "incredibly reflective" when

the Sun comes up. From this, Hoagland concludes that this feature is made of mirror-like "artificial surface materials." Kind of like the Luxor Casino pyramid in Las Vegas, perhaps?

Speaking of Mars, the conspiracy-oriented "Mind Control" Web site www.raven1.net reveals that yet another Face has recently been discovered. This one seems to be wearing a "crown"—apparently revealing that our ancient Martian ancestors had kings. You can see it at www.raven1.net/crownedface.jpg.

* * *

Even though the major media haven't been reporting much about crop circles lately, the circles keep getting more complex, and the purported messages more elaborate. According to Marshall Masters, a frequent guest on *Coast to Coast AM*, a complex crop circle pattern near the Chilbolton Radio Telescope in England appears to be a response to the SETI message sent out by Carl Sagan and Frank Drake in 1974 (see www.yowusa.com/Archive/May2003/crabwood4/crabwood4.htm), even though those researchers used the Arecibo telescope in Puerto Rico, thousands of miles away. Another researcher, Maurice Osborne, claims to have deciphered the ET's message, encoded in binary patterns of broken grain. Encoded using the ASCII code set in

widespread use in personal computers, it supposedly reads, "Beware the bearers of FALSE gifts & their BROKEN PROMISES. Much PAIN but still time. BELIEVE. There is GOOD out there. We oppose DECEPTION. Conduit CLOSING."

The Web site www.cropcircleconnector.com notes that there were just three circle formations each found during the months of April and May 2003. That number suddenly jumped to twenty-one in June, as if the extraterrestrial circle makers suddenly had much more time on their hands. In July it rose to twenty-five. The August numbers (not yet complete as this is written) continue at a good clip. It will be interesting to see if the numbers drop off significantly when the school session on Alpha Centauri begins again in September.

Closer to home, thousands of tourists began flocking to the Sacramento Valley in July when a string of six crop circles was discovered near Fairfield. However, soon four teenagers confessed that they had made the circles using boards connected to a rope. According to a story in the *Vallejo Times-Herald*, they had seen a television documentary about crop circles, and decided to try to make some themselves (see <http://timesheraldonline.com/articles/2003/07/11/news/news03.txt>). Apparently the first-time circlemakers were not very skillful, because the pilot who discovered the circles said that it looked like "drunk aliens" had created them.

But who says that crop circles can occur only on farms, in crops? Why not in vacant lots, in the weeds? The newest twist in the circles phenomenon is "weed circles" (see <http://www.paratexas.com/Vacantlotcircles.htm>). The group ParaTexas, which specializes in "paranormal investigations of Texas," reports on an unexplained circle discovered on August 12 in the weeds of a vacant lot near Galveston. What's even more remarkable, using "Electronics Voice Phenomena" (EVP), researchers Rich and Mary Smith found that the weed circle was emanating electronic voices from the spirit world. Fortunately, the weed circles were not found to be magnetic or radioactive, so there's no danger in approaching them. □



THINKING ABOUT SCIENCE

MASSIMO PIGLIUCCI

The Sin of Scientism

The United States is characterized by a peculiar mixture of science-worshipping and anti-intellectualism. On the one hand, America is the clear world leader in science and technology, boasting achievements such as landing a human on the Moon (or, more questionably, inventing and using nuclear weapons). On the other hand, almost half of the American people don't "believe" in evolution, and many espouse all sorts of doubtful or downright silly beliefs in paranormal phenomena. How is this possible?

Many explanations have been proposed, and undoubtedly several are needed. As is often the case with complex sociological phenomena, many factors are at play simultaneously, and there is no simple answer to the problem. I'd like to focus here on what I think certainly is one of these factors, which when mentioned finds scientists and skeptics immediately on the defensive: the intellectual hubris of scientism.

Scientism is not a philosophical position that people espouse of their own choice. There is no National Association for the Advancement of Scientism, and in fact there is not even a word to label

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a person who engages in scientism (engaging in scientistic behavior doesn't make you a scientist). Indeed, the word is often hurled at people as an insult, especially by philosophers at other philosophers, or by creationists at evolutionary biologists and other scientists.

Scientism is essentially an ideological position implying that science is the only key to solve any problem worth addressing, and that—given enough time and

plexities of human mental phenomena into current neurobiological parlance, perhaps it is the latter that is at fault for being too simplistic. The Churchlands, on the other hand, have faith in the fact that eventually psychology will be absorbed into biology, just as chemistry is now considered largely a branch of physics. Perhaps, but the jury is obviously still out, and it seems premature to be too dogmatic on the matter.

Scientism is essentially an ideological position implying that science is the only key to solve any problem worth addressing, and that—given enough time and resources—science in fact will solve those problems.

resources—science in fact will solve those problems. Let us consider philosophers Patricia and Paul Churchland's rather radical idea that emotions do not exist. Their notion of "eliminativism" (see Armstrong, D.M., 1999. The eliminativist theory, pp. 91–99 in *The Mind-Body Problem: An Opinionated Introduction*. Westview Press, Boulder, Colorado) aims at reducing all psychological talk to terms of neurobiology, and the idea is that when one thinks of neurons and electrical potentials, one does not need to bring up cumbersome and vague concepts such as emotion. One could object that if there is a problem when attempting to translate the com-

Another example of scientism can be found in the ambitious program that E.O. Wilson set up for himself when writing his *Consilience: The Unity of Knowledge*. In it, the famous biologist (already controversial enough for wishing to straightforwardly extend the sociobiology of ants to that of human beings) attempted to present the broad picture of a "consilience," i.e., a unification, of all branches of human knowledge, from science to history, from religion to art. The problem was that rather than a unification, Wilson's project increasingly took the shape of a program of academic imperialism in which science would eventually reduce and explain everything else.

Skeptics have their share of scientific tendencies, real or perceived, as on those occasions in which they dismiss out of hand (i.e., without serious consideration, or based only on armchair investigations) new or unusual phenomena. We should always remember that plenty of currently accepted scientific discoveries were once thought to be "impossible" or to contradict established scientific principles (heliocentrism, the theory of evolution, and continental drift immediately come to mind).

What, exactly, is wrong with scientism? I maintain that there are two categories of problems with it, which every serious skeptic should ponder from time to time. First, it is philosophically untenable. Just because science has been

such a successful activity in the past, it simply does not follow that it will continue to be so in the future, or that it will work in any particular case. To think otherwise is to put an unsubstantiated amount of trust in the method of induction (the idea that one can generalize from past experience), a principle that in itself cannot be justified on scientific grounds (see the May/June 2003 "Thinking About Science" column).

Second, and perhaps more importantly, adopting a scientific attitude is likely to result in very bad publicity with the average citizen. The essence of science is the application of critical thinking to empirically verifiable questions, and the last thing one should do in order to foster such attitude is to engage

in what other people justly perceive as an argument from authority ("believe me, I have a Ph.D. in the sciences..."). What we often fail to convey to the public is not that science is incredibly effective at solving a wide variety of problems—it obviously is. We fail to present science as an open-ended inquiry, a process of continuous revision of its own findings, a metaphor of the never-ending quest for human knowledge and wisdom. Scientism is the secular equivalent of religious bigotry, and it does no good to either society or to science itself.

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NOTES ON A STRANGE WORLD MASSIMO POLIDORO

Houdini's Final Days

One of the best things about lecturing around the world is the chance to meet a lot of interesting people. That's what happened, for example, when I was touring the United States in August 2001 to speak about my book *Final Séance*, about the curious friendship between Harry Houdini and Sir Arthur Conan Doyle.

Naturally, I was approached by many fans, students, and historians of both Doyle and Houdini, but also by other intriguing people. There was a man in Cleveland, Ohio, who told me I could get all the information I wanted on Doyle directly from him—meaning not the Cleveland, but "him," Doyle himself! This man did not claim to be a medium but, nonetheless, believed he had talked many times with the spirit of Doyle. To prove it he told me he had taped all these conversations and promised to send them to me. When after some time I received the tapes they were completely blank. Maybe he had made some mistake duplicating them, or they had been erased during shipping, or maybe the man had tried to tape conversations that only happened in his mind.

A more fruitful meeting took place in Eugene, Oregon, at the Skeptic's Toolbox Workshop sponsored by CSICOP and held at the University of Oregon. I met Donald Sandweiss, M.D., who told me

he had an elderly acquaintance whose deceased husband was the physician who initially attended Houdini during his terminal illness in Detroit. Would I be interested in having her tell me this story?

Of course I was! Though we could not meet in person, eventually Dr. Sandweiss graciously wrote me and sent a written memoir of Ethel Cohn Schatz, the widow of Houdini's physician.

Tragedy Strikes

In October 1926, Houdini, then fifty-two years old, was touring North America with his grand show of magic and escapes. He had opened on September 13 at the Majestic Theater in Boston, and when the tour had reached Albany on October 11, Houdini was getting quite tired. His wife Bess had been ill and he had not slept for almost three days in order to spend time close to her in New York. When he arrived in Albany, nonetheless, he went on stage and performed in the scheduled show. During the performance of the famous Water Torture Cell act, the apparatus that held him upside down suddenly snapped and he broke his left ankle. A physician ordered that he be taken immediately to the hospital, but Houdini refused, wanting to finish the show.

Only after the curtains had been lowered on the closing act did Houdini agree

to visit the hospital, but again he refused to get the needed rest; he had his foot put in plaster and resumed his scheduled tour. He continued to appear in his complete evening's entertainment of magic, escapes, and pseudo-spiritualism, moving from Albany to Schenectady. On the eighteenth he arrived in Montreal, Canada, where physicians strenuously advised him against continuing his public performances until his leg healed. But Houdini adamantly continued.

On October 22, Houdini was visited backstage by a few students. One of them began drawing a portrait of the magician, who was then laying on a couch reading his mail. To the students Houdini looked like someone "much in need of a long, carefree vacation"; still, he was kind, affable, and made them feel comfortable. They talked for a while, and Houdini answered all of their questions. "Is it true, Mr. Houdini," asked then a student named Wallace Whitehead, "that you can resist the hardest blows struck to the abdomen?"

The unexpected question took everybody aback. Houdini, who had never claimed such a thing, tried to change subject. But the student persisted.

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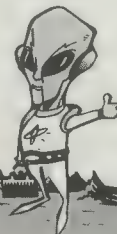
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Houdini replied that he had strong muscles in his arms and back.

"Would you mind if I delivered a few blows to your abdomen, Mr. Houdini?" was the next surprising question from Whitehead.

Houdini accepted, but as he tried to get up from the couch, the well-built young man began punching him in the stomach with terribly forcible punches.

"Hey there!" cried out one of the students. "You must be crazy. What are you doing?"

Whitehead delivered a few more punches and, when Houdini murmured "That will do," stopped his attack. The atmosphere slowly returned back to normal as Houdini regained his breath. The portrait was finished and handed to Houdini. "You made me look a little tired in this picture," remarked the magician. "The truth is, I don't feel so well." He thanked the students and said goodbye.

That night he performed his show as expected, but between intermissions he rested on his couch in a cold sweat. After the performance he rushed to the station to catch a train for Detroit, where he was scheduled to open the next evening. On the train, however, the stomach pain became unbearable and a wire had to be sent ahead asking for a physician to meet them at the Detroit station.

The doctor found signs of appendicitis and urged him to enter a hospital. Houdini, instead, went to his hotel, where he shook with chills. On October 24 he went to Detroit's old Garrick Theatre and opened the show, although his temperature had reached 104 and he collapsed twice between intermissions. After the show was over, the magician returned to his room at the Statler Hotel and collapsed in the middle of the night.

Enter Dr. Daniel Cohn.

The Dying Magician

"Daniel," remembers Ethel Cohn Schatz, "not yet my husband at that time, was only twenty-five years old, a 'young punk' as he described himself. He had recently completed his residency at Grace Hospital and had just opened an office to start private practice. He had earned his medical degree at the University of Michigan Medical School."

How did it happen that a young, inexperienced practitioner was called in to see the great Houdini? According to Mrs. Cohn Schatz,

An older colleague of Daniel's, leaving on vacation, asked him to substitute as house physician at the Statler. Daniel, with few patients of his own, complied with enthusiasm. As soon as Daniel examined Houdini and heard his story, as told by his wife Bess, he called Dr. Kennedy, chief of surgery at Grace Hospital. Sick as Houdini was, however, he refused to go to the hospital until Daniel called Houdini's own physician in New York and explained the urgency of the case. His physician persuaded him to go, he was admitted to the hospital and Kennedy operated immediately.

There were no antibiotics then and without the miracle drugs that we take for granted today, medical science knew of nothing to save Houdini's life. When the surgeon operated and discovered a ruptured, gangrenous appendix, the doctors realized the magician was doomed.

Innumerable medical men were called in consultation to treat him. They were all well-established, outstanding physicians with many patients of their own. Only one young physician had nothing but time.

Daniel welcomed the opportunity to spend night and day at Houdini's bedside. At the end, an awestruck young novice became friend and confidant to a dying magician.

When Daniel wrote the case history, he found it intriguing that Houdini designated his occupation first as an author and second as a magician. The world knew him then as it remembers him now, as an extraordinary magician and showman. But he prided himself much more on the many books and articles he had written, books and articles rarely read today.

Every evening Daniel sat at Houdini's bedside listening to his halting sentences as he reminisced mostly about his childhood. Born in Hungary, he grew up in Appleton, Wisconsin, the son of a rabbi.

Though he had no appetite for food, he said to Daniel one evening, "I have a yen for Farmer's Chop Suey."

Farmer Chop Suey is a favorite dish in Jewish homes, consisting of raw vegetables combined with sour cream. Daniel walked over to a

nearby delicatessen on Woodward Avenue and bought two portions. As they were eating, Houdini said, "If I die, don't be surprised if phony spiritualists declare a national holiday." His public battles with spiritualists were well-known.

The operation, however, did not save Houdini; the infection had already spread through Houdini's body. The situation was desperate, and the physicians issued a statement indicating that he was near death. Houdini seemed to improve after the doctors gave him an experimental serum; but he had to be operated on again and the situation got worse.

On October 29, he told Bess to "be prepared, if anything happens," meaning by this not only to expect the worse, but also to be ready should he try to contact her from beyond the grave. On the thirty-first Houdini said to his brother: "I'm tired of fighting, Dash. I guess this thing is going to get me." At 1:26 P.M., October 31, Halloween, Harry Houdini died.

Mrs. Cohn Schatz notes that

The insurance company questioned whether abdominal punches could possibly cause an appendix to rupture and lead to a fulminating streptococcal peritonitis. All the physicians on the case testified that this was 'the first case of undoubted traumatic appendicitis' they had ever seen. The New York Life Insurance Company then paid Bess Houdini double indemnity.

Daniel's name appeared in newspapers and in newscasts in Detroit and all across the country, even abroad. After hearing that he was the doctor who took care of the great Houdini, countless patients called his office for appointments.

Daniel was overwhelmed by the widespread publicity and the sudden burgeoning of his medical practice. But more than anything, he treasured for the rest of his life, the memory of the serendipitous stroke of chance that led a 'young punk' to meet, treat and get close enough to know as a warm, likeable person, a renowned magician on his deathbed.

Acknowledgments

I would like to thank Mrs. Ethel Cohn Schatz for leaving a written testimony of her husband's experience, and Dr. Donald Sandweiss for letting me have it. □

Ann Druyan Talks About Science, Religion, Wonder, Awe . . . and Carl Sagan

It is a great tragedy that science, this wonderful process for finding out what is true, has ceded the spiritual uplift of its central revelations: the vastness of the universe, the immensity of time, the relatedness of all life, and life's preciousness on our tiny planet.

ANN DRUYAN

I've been thinking about the distorted view of science that prevails in our culture. I've been wondering about this, because our civilization is completely dependent on science and high technology, yet most of us are alienated from science. We are estranged from its methods, its values, and its language. Who is the scientist in our culture? He is Dr. Faustus, Dr. Frankenstein, Dr. Strangelove. He's the maker of the Faustian bargain that is bound to end badly. Where does that come from? We've had a long period of unprecedented success in scientific discovery. We can do things that

even our recent ancestors would consider magic, and yet our self-esteem as a species seems low. We hate and fear science. We fear science and we fear the scientist. A common theme of popular movies is some crazed scientist somewhere setting about ruining what is most precious to all of us.

I think the roots of this antagonism to science run very deep. They're ancient. We see them in Genesis, this first story, this founding myth of ours, in which the first humans are doomed and cursed eternally for asking a question, for partaking of the fruit of the Tree of Knowledge.

It's puzzling that Eden is synonymous with paradise when, if you think about it at all, it's more like a maximum-security prison with twenty-four hour surveillance.

It's puzzling that Eden is synonymous with paradise when, if you think about it at all, it's more like a maximum-security prison with twenty-four hour surveillance. It's a horrible place. Adam and Eve have no childhood. They awaken full-grown. What is a human being without a childhood? Our long childhood is a critical feature of our species. It differentiates us, to a degree, from most other species. We take a longer time to mature. We depend upon these formative years and the social fabric to learn many of the things we need to know.

So here are Adam and Eve, who have awakened full grown, without the tenderness and memory of childhood. They have no mother, nor did they ever have one. The idea of a mammal without a mother is, by definition, tragic. It's the deepest kind of wound for our species; antithetical to our flourishing, to who we are.

Their father is a terrifying, disembodied voice who is furious with them from the moment they first awaken. He doesn't say, "Welcome to the planet Earth, my beautiful children! Welcome to this paradise. Billions of years of evolution have shaped you to be happier here than anywhere else in the vast universe. This is your paradise." No, instead God places Adam and Eve in a place where there can be no love; only fear, and

Ann Druyan is a cowriter with the late Carl Sagan of the Emmy and Peabody award-winning series Cosmos. Their twenty-year professional collaboration included NASA's Voyager Interstellar Message and many speeches, articles, and books, including Shadows of Forgotten Ancestors and Comet. She was co-creator with Sagan of the motion picture Contact, and a credited contributor to his Pale Blue Dot, The Demon-Haunted World, and Billions and Billions. She is co-founder and CEO of Cosmos Studios, as well as Program Director of Cosmos 1, the first solar sailing spacecraft mission. She and Carl Sagan were married until his death in 1996. They have two children.

fear-based behavior, obedience. God threatens to kill Adam and Eve if they disobey his wishes. God tells them that the worst crime, a capital offense, is to ask a question; to partake of the fruit of the Tree of Knowledge. What kind of father is this? As Diderot observed, the God of Genesis "loved his apples more than he did his children."

This imperative not to be curious is probably the most self-hating aspect of all, because what is our selective advantage as a species? We're not the fastest. We're not the strongest. We're not the biggest. However, we do have one selective advantage that has enabled us to survive and prosper and endure: A fairly large brain relative to our body size. This has made it possible for us to ask questions and to recognize patterns. And slowly over the generations we've turned this aptitude into an ability to reconstruct our distant past, to question the very origins of the universe and life itself. It's our only advantage, and yet this is the one thing that God does not want us to have: consciousness, self-awareness.

Perhaps Genesis should be read as an ironic story. Here's a god who does not give us the knowledge of good and evil. He knows we don't know right from wrong. Yet he tells us not to do something anyway. How can someone who doesn't know right from wrong be expected to do the right thing? By disobeying god, we escape from his totalitarian prison where you cannot ask any questions, where you must never question authority. We become our human selves.

Our nation was founded on a heroic act of disobedience to a king who was presumed to rule by divine right. We created social and legal mechanisms to institutionalize the questioning of authority and the participation of every person in the decision-making process. It's the most original thing about us, our greatest contribution to global civilization. Today, our not-exactly-elected officials try to make it seem as if questioning this ancient story is wrong. . . . That the teaching of our evolving understanding of nature, which is a product of what we have been able to discover over generations, is somehow un-American or disrespectful of strongly held beliefs. As if we should not teach our children what we've learned about our origins, but rather we should continue to teach them this story which demonizes the best qualities of our founding fathers.

This makes no sense and it leads me to a question: Why do we separate the scientific, which is just a way of searching for truth, from what we hold sacred, which are those truths that inspire love and awe? Science is nothing more than a never-ending search for truth. What could be more profoundly sacred than that? I'm sure most of what we all hold dearest and cherish most, believing at this very moment, will be revealed at some future time to be merely a product of our age and our history and our understanding of reality. So here's this process, this way, this mechanism for finding bits of reality. No single bit is sacred. But the search is.

And so we pursue knowledge by using the scientific method to constantly ferret out all the mistakes that human

beings chronically make, all of the lies we tell ourselves to combat our fears, all of the lies we tell each other. Here's science, just working like a tireless machine. It's a phenomenally successful one, but its work will never be finished.

In four hundred years, we evolved from a planet of people who are absolutely convinced that the universe revolves around us. No inkling that the Sun doesn't revolve around us, let alone that we are but a minuscule part of a galaxy that contains roughly a hundred billion stars. If scientists are correct, if recent findings of planets that revolve around other stars are correct, there are perhaps five hundred billion worlds in this galaxy, in a universe of perhaps another hundred billion galaxies. And it is conceivable, even possible, that this universe might one day be revealed to be nothing more than an electron in a much greater universe. And here's a civilization that was absolutely clueless four or five hundred years ago about its own tiny world and the impossibly greater vastness surrounding it. We were like a little bunch of fruit flies going around a grape, and thinking this grape is the center of everything that is. To our ancestors the universe was created for one particular gender of one particular species of one particular group among all the stunning variety of life to be found on this tiny little world.

There was only one problem. These very special beings for whom the universe was created had a holiday called Easter and they wanted to be able to celebrate it on the same day at the same time. But in this geocentric universe that they blissfully inhabited, there was no way to create a workable calendar that was coherent. At this time, there was a phrase to describe what science was. It is suffused with disarming candor and not a bit of self-consciousness at all. It was called *saving the appearances*. That was the task of science: To save the appearances. Figure out a way to take the reported appearances of the stars and the planets in the sky and predict with some reliability where they would be in the future. It's almost as if they knew they were living a cosmic lie. To call it saving the appearances is wonderful.

So the Lateran Council of 1514 was convened, and one of its main goals was to figure out a calendar that everybody could use so that they won't be celebrating Easter on different days. A man named Nicolas Copernicus, who was a very religious guy, whose lifelong career was in the church, had already figured out what the problem was. He was invited to present

this information at the Council, but he declined because he knew how dangerous it would be to puncture this cosmological illusion. Even though the pope at that moment was not actually terribly exercised about this idea, Copernicus's fears were not baseless. Even sixty years later, a man named Giordano Bruno was burned alive for one reason: he would not utter the phrase, "There are no other worlds."

I've thought about this a lot. How could you have the guts to be willing to be burned alive? Bruno had no community of peers to egg him on. He wasn't even a scientist, he didn't really

have any scientific evidence, but he chose this horrible death because he refused to say this phrase: "There are no other worlds." It's a magnificent thing, it's a wondrous mystery to me, and I don't think I completely understand how it was possible.

Copernicus did find the courage to publish his idea when he was comfortably near a natural death. When in 1543, *On The Revolutions of Celestial Spheres* was published, something unprecedented happened: a trauma from which we have never recovered. Up until that time, the sacred and the scientific had been one. Priests and scientists had been one in the same. It is true that two millennia before Copernicus there had been the pre-Socratic philosophers, who really were the inventors of science and the democratic values of our society. These ancient Greeks could imagine a universe and a world without God. But they were

very much the exception, flourishing too briefly before being almost completely extirpated philosophically by the Platonists. Many of their books were destroyed. Plato loathed their materialism and egalitarian ideals. So there really wasn't a vibrant school of thought with a continuous tradition that survived down through the ages, daring to explain the wonder of nature without resorting to the God hypothesis.

It was actually initiated by a group of uncommonly religious men like Copernicus, Newton, Kepler, and (much later) even Darwin, who catalyzed that separation between our knowledge of nature and what we held in our hearts. All four of them either had religious careers or were contemplating such a profession. They were brilliant questioners, and they used the sharpest tools they had to search for what was holy. They had enough confidence in the reality of the sacred to be willing to look at it as deeply as humanly possible. This unflinching search led to our greatest spiritual awakening—



Ann Druyan

the modern scientific revolution. It was a spiritual breakthrough, and I think that it is our failure to recognize it as such that explains so much of the loneliness and madness in our civilization, so much of the conflict and self-hatred. At that time, the public and their religious institutions, of course, rejected out of hand their most profound insights into nature. It was several hundred years before the public really thought about this, and took seriously what Copernicus was saying. The last four centuries of disconnect between what our elders told us and what we knew was true has been costly for our civilization.

I think we still have an acute case of post-Copernican-stress syndrome. We have not resolved the trauma of losing our infantile sense of centrality in the universe. And so as a society we lie to our children. We tell them a palliative story, almost

It has only been through science that we have been able to pierce this infantile, dysfunctional need to be the center of the universe, the only love object of its creator.

to ensure that they will be infantile for all of their lives. Why? Is the notion that we die so unacceptable? Is the notion that we are tiny and the universe is vast too much of a blow to our shaky self-esteem?

It has only been through science that we have been able to pierce this infantile, dysfunctional need to be the center of the universe, the only love object of its creator. Science has made it possible to reconstruct our distant past without the need to idealize it, like some adult unable to deal with the abuse of childhood. We've been able to view our tiny little home as it is. Our conception of our surroundings need not remain the disproportionate view of the still-small child. Science has brought us to the threshold of acceptance of the vastness. It has carried us to the gateway of the universe. However, we are spiritually and culturally paralyzed and unable to move forward; to embrace the vastness, to embrace our lack of centrality and find our actual place in the fabric of nature. That we even *do* science is hopeful evidence for our mental health. It's a breakthrough. However, it's not enough to allow these insights; we must take them to heart.

What happened four or five hundred years ago? During this period there was a great bifurcation. We made a kind of settlement with ourselves. We said, okay, so much of what we believed and what our parents and our ancestors taught us has been rendered untenable. The Bible says that the Earth is flat. The Bible says that we were created separately from the rest of life. If you look at it honestly, you have to give up these basic ideas, you have to admit that the Bible is not infallible, it's not the gospel truth of the creator of the universe. So what did we do? We made a corrupt treaty that resulted in a troubled peace:

We built a wall inside ourselves.

It made us sick. In our souls we cherished a myth that was rootless in nature. What we actually knew of nature we compartmentalized into a place that could not touch our souls. The churches agreed to stop torturing and murdering scientists. The scientists pretended that knowledge of the universe has no spiritual implications.

It's a catastrophic tragedy that science ceded the spiritual uplift of its central revelations: the vastness of the universe, the immensity of time, the relatedness of all life and its preciousness on this tiny world.

When I say "spiritual," it's a complicated word that has some unpleasant associations. Still, there has to be a word for that soaring feeling that we experience when we contemplate

13 billion years of cosmic evolution and four and a half billion years of the story of life on this planet. Why should we give that up? Why do we not give this to our children? Why is it that in a city like Los Angeles, a city of so many churches and temples and mosques, there's only one place like this Center for Inquiry? And that it's only us here today? Fewer than a hundred people in a city of millions? Why is that? Why does the message of science not grab people in their souls and

give them the kind of emotional gratification that religion has given to so many?

This is something that I think we have to come to grips with. There's a confusion generally in our society. There is a great wall that separates what we *know* from what we *feel*.

Medicine has had an oath that goes back to Hippocrates. Hippocrates is an amazing figure, both a father of scientific ethics and first articulator of the insight that frees humankind to discover the universe. He's one of those pre-Socratic philosophers I was talking about earlier, and he said something that resonated for me at a moment in my life when I realized what my path would be. His words inspired me to try as hard as I could in my own life to make it matter what is true. Hippocrates was writing in an essay called *Sacred Disease* 2,500 years ago. He was writing about the sacred disease that is now called epilepsy, and very matter-of-factly he said something that struck me like a lightning bolt. I'll paraphrase: "People believe that this disease is sacred simply because they don't know what causes it? But some day I believe they will, and the moment they figure out why people have epilepsy, it will cease to be considered divine." Why don't we have schools everywhere that teach children about Hippocrates, about the power of asking questions, rather than cautionary tales about the punishment for doing so. Our kids are not taught in school about Hippocrates, not taught about this multigenerational process of divesting ourselves of superstitions, false pattern recognition, and all the things that go with it, racism, sexism, xenophobia, all that constellation of baggage that we carry with us. We live in a society now where our leadership is all about promoting superstition, promoting xenophobia.

* * *

It seems to me that the biggest challenge we face is to evolve a language that couples the cold-eyed skepticism and rigor of science with a sense of community, a sense of belonging that religion provides. We have to make it matter what is true. If instead we say that what really matters is to have faith, what really matters is to believe, we'll never get there. It's not enough to have forty minutes of science in the daily school program, because science shouldn't be compartmentalized that way. Science is a way of looking at absolutely everything.

What I find disappointing about most religious beliefs is that they are a kind of statement of contempt for nature and reality. It's absurdly hubristic. It holds the myths of a few thousand years above nature's many billion-year journey. It says reality is inferior and less satisfying than the stories we make up.

* * *

We need to create a community of skepticism for people of all ages. We desperately need some good music. We don't have to cut any corners on our ethos of skepticism. We do have to learn how to instill a sense of community, a rational experience of communion with nature and each other.

I would love to see, actually, not so much building more Centers for Inquiry, which would be great, but why don't we take over the planetaria of the country, of which there are hundreds, and turn them into places of worship. Not worship of the science that we know of this moment. Always give the message, over and over again, that our understanding could be wrong, this is what we think at this moment. The wonder of science is that we may find out that all of this is untrue. Why don't we take over these places and have services in the planetaria. We can connect. We can find inspiration in the revelations of science. We can have skepticism and wonder, both.

* * *

To me, faith is antithetical to the values of science. Not hope, which is very different from faith. I have a lot of hope. Faith is saying that you can know the outcome of things based on what you hope is true. And science is saying in the absence of evidence, we must withhold judgment. It's so hard to do. It's so tempting to believe in the lie detector or in heaven or that you know who you are based on the day of the month that you were born. It's a sort of unearned self-esteem. It's an identity that you can slip right into, and it's tremendously reassuring. So, I don't have any faith, but I have a lot of hope, and I have a lot of dreams of what we could do with our intelligence if we had the will and the leadership and the understanding of how we could take all of our intelligence and our resources and create a world for our kids that is hopeful.

I had a wonderful experience writing for the relatively new Rose Center at the Hayden Planetarium in New York. It's the greatest virtual reality theatre on Earth; completely immersive

in the experience of travelling through the universe. I was honored to cowrite, with our *Cosmos* cowriter Steve Soter, the first two shows that inaugurated the planetarium center. And this is what got me thinking about how we might offer something that would be at least as compelling as whatever anyone else in the religion business is offering. We get to take you through the universe, and through the history of not only the Milky Way Galaxy but also the larger universe, and to tell something—the second one's called *The Search for Life, Are We Alone?*—something about the nature of life. It's a very unpromising message about evolution and I think very directly promotes the kind of values and ideas that I think we share. Every kid who goes to a city public school gets taken to these shows. It was eye-opening to me, first of all, how far you could go in this direction, and what you could do with music and a

It's not enough to have forty minutes of science in the daily school program, because science shouldn't be compartmentalized that way. Science is a way of looking at absolutely everything.

fantastic technical capability that lets you tour that part of the universe we have come to know something about. You really hold on to your chair. You feel like you're traveling through the galaxies. It's uplifting. I constantly get mail about this and everyone is saying the same thing: you made me feel a part of something. You made me feel, even though I'm really small, that I'm a part of this greater fabric of life, which is so beautiful. And that's the kind of stuff that *Cosmos Studios* is working on, all of our projects. If they don't combine rigorous science with that soaring, uplifting feeling, then they don't qualify as a project for us. So I would say that that there's a lot in the entertainment world that we could be doing that I think has the power to really reach people.

* * *

Since we founded *Cosmos Studios* in the spring of 2000, we have accomplished the following: We are launching *Cosmos 1*, the first solar sailing spacecraft later this year. Our partners are The Planetary Society and the Babakin Space Research Center of Russia. We are actually launching the spacecraft from an intercontinental ballistic missile based on a Russian submarine. We have taken this weapon of mass destruction and converted it to a means of advancing the dream of space exploration. Solar sailing is an idea that has been around in science since the 1920s, but it's never been tried before. If we succeed, we will have demonstrated a practical means of literally riding light all the way to the stars. We liken our solar sail to what the Wright brothers did at Kitty Hawk, because although they were aloft for only twelve seconds and went 165 feet, they demonstrated

that powered flight in a heavier than air vehicle was possible. What we're trying to demonstrate is that solar sailing is possible, and solar sailing is the only physically sound way of which we know to travel so quickly that it begins to be feasible to do interstellar flight on human time scales—two thousand years to the nearest star instead of twenty thousand years.

Cosmos Studios has funded research that has resulted in two papers published in the journal *Science*. We have produced a spiffed-up version of the thirteen-hour *Cosmos* TV series on DVD. We have produced three full-length documentaries. Perhaps our most promising project is an ambitious new way of teaching science from pre-kindergarten through high school. This involves a whole new approach to curricula. We hope to engage people from early childhood in science as a way of thinking.

I'm also at work on a book dealing with the themes I've tried to cover here.

* * *

[In answer to a question about Carl Sagan's role in garnering support for the legitimate scientific search for extraterrestrial intelligence (SETI) and taking on the creationists]:

Congress cut off federal funding for SETI years ago. I was with Carl when he went into Senator William Proxmire's office after Proxmire had given the Golden Fleece Award to the SETI program. Carl sat down with him. I didn't say a word. I was just a witness. And I just watched Carl. I was inspired by him, by not only the breadth of his knowledge, but his patience, his lack of arrogance, his willingness to hear the other person out. Senator Proxmire did a complete turnabout as a result of that meeting.

And there were other instances of Carl's remarkable persuasiveness. One was a great story of a so-called "creation scientist" who watched Carl testify at a hearing about creationism in schools. Carl testified for about four hours. It was somewhere in the South, I can't remember where. And six months later a letter came from the "creation scientist" expert who had also testified that day, saying that he had given up his daytime job and realized the error of what he was doing. It was only because Carl was so patient and so willing to hear the other person out. He did it with such kindness and then, very gently but without compromising, laid out all of the things that were wrong with what this guy thought was true. That is a lesson that I wish that all of us in our effort to promote skepticism could learn, because I know that very often the anger I feel when confronting this kind of thinking makes me want to

start cutting off the other person. But to do so is to abandon all hope of changing minds.

* * *

When my husband died, because he was so famous and known for not being a believer, many people would come up to me—it still sometimes happens—and ask me if Carl changed at the end and converted to a belief in an afterlife. They also frequently ask me if I think I will see him again. Carl faced his death with

unflagging courage and never sought refuge in illusions. The tragedy was that we knew we would never see each other again. I don't ever expect to be reunited with Carl. But, the great thing is that when we were together, for nearly twenty years, we lived with a vivid appreciation of how brief and precious life is. We never trivialized the meaning of death by pretending it was anything other than a final parting. Every single moment that we were alive and we were together was miraculous—not miraculous in the sense of inexplicable or supernatural. We knew we were beneficiaries of chance. . . . That pure chance could be so generous and so kind. . . . That we could find each other, as Carl wrote so beautifully in *Cosmos*, you know, in the vastness of space and the immensity of time. . . . That we could be together for twenty years. That is something which sustains me and it's much more meaningful. . . . The way he treated me and the way I treated him, the way we took care of each other and our family, while he lived. That is so much more important than the idea I will see him someday. I don't think I'll ever see Carl again. But I saw him. We saw each other. We found each other in the cosmos, and that was wonderful. □

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Here is the dedication Carl Sagan wrote in his best-selling book *Cosmos*:

For Ann Druyan

In the vastness of space and the immensity of time,
it is my joy to share
a planet and an epoch with Annie.



Carl Sagan

Less About Appearances: Art and Science

Visual art throughout history has given form and shape to fictional spaces—habitats to the gods, myths, and legends. But art has changed, slowly moving from fictional space into physical space—leading some artists to an interest in science and the untamed complexity of the real.

STEPHEN NOWLIN

Along with the development of supernatural beliefs, humans long ago invented fictional spaces—extra dimensions of the imagination that augment physical reality. Fictional spaces are ubiquitous throughout social and cultural history as the habitat for gods, spirits, mythologies, and legends, as well as for art and literature. For thousands of years visual art has given form and shape to fictional spaces, using the tools of pictorialism and vanishing-point perspective to build a convincing illusory world, full of meanings that resonate back in physical reality. However in the middle of the nineteenth century visual art began a slow process of flattening illusionist perspective, ultimately opening the door to works of art that were neither fictional nor

illusory. In the twenty-first century this history of objectification has combined with new technologies to lead some artists toward an interest in science, and in combination art and science can forge a kind of nonsupernatural spirituality—a deep appreciation for the beauty and untamed complexity of the real.

In 1960, the French artist Jean Tinguely's self-destructing kinetic sculpture *Homage to New York* was installed at New York's Museum of Modern Art. A bizarre assortment of wheels, levers, pulleys, and sciencey-looking gizmos, the work symbolized the apocalyptic momentum of over-industrialization. In creating his sculpture, Tinguely benefited from technical assistance by Swedish-born Bell Laboratories engineer Billy Kluver, a clever and visionary scientist who went on to work with the celebrated New York artists Andy Warhol, Jasper Johns, and Robert Rauschenberg. Together, Rauschenberg and Kluver developed an initiative called Experiments in Art and Technology (EAT) which would have a profound impact on the art of successive decades. EAT was an endeavor that Rauschenberg hoped would "develop an effective collaboration between engineer and artist. The raison d'être of EAT is the possibility of a work which is not the preconception of either the engineer or the artist, but is the result of the exploration of the human interaction between them."

Recently, a younger generation of artists emerged to continue the investigations of EAT; this time using tools of the twenty-first century. A series of exhibitions have appeared at

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various museums, reflecting a growing interest in the new expressive potential revealed by combining art, science, and technology. Shows such as *BitStreams* at the Whitney Museum of American Art (2001) and *010101: Art in Technological Times* at San Francisco Museum of Modern Art (2001) surveyed new expressions being

forged via the use of digital media, while *Gene(sis): Contemporary Art Explores Human Genomics* at the Henry Art Gallery (2002), NEURO at Art Center College of Design's Williamson Gallery (2003), and *Signatures of the Invisible* at PS1 in New York (2003) focus even more specifically on the intersection of art and science.

Avant-garde as it may sound to some, the modulation of art and science is not something particularly new to history. As early as the first known cave paintings more than 30,000 years ago, the study of mammalian anatomy and the art of representation were integrated and infused with a sense of magic. The architects and sculptors who built places like England's Stonehenge 25,000 years later were also some of history's first scientists (as well as high priests), contributing to our early understanding of astronomy and structural engineering. A few millennia later Leonardo da Vinci thought of himself in equal parts as artist and engineer. Throughout human history, social and cultural evolu-

tion have been threaded together by the integration of art and science, and this collaboration has been tightly interwoven with the evolution of spiritual beliefs and theories.

To house the deities of those beliefs, fictional spaces were invented and then elaborated upon over the eons. Humans of all sorts, beliefs, and persuasions appear to enjoy their fictional spaces, even those understood to be no more than products of imagination (witness the always popular Hollywood movie, not to mention the ubiquitous TV drama and sitcom!). But the spaces where gods and spirits live are considered not to be imaginary, but actual. These are the serious fictional spaces—the ones inextricably tied to operations within our own common reality. Judged to be as genuine as the one we occupy, these fictional spaces and our own are believed to have borders that are open and porous.

Explanations for how the universe works, even if dubious and ultimately untrue, can be made to seem more convincing

if the medium used to communicate them is itself convincingly structured. So, as a kind of architecture of fictional space, two-dimensional pictorialism and, in particular, vanishing-point perspective from the middle of the fifteenth century on, infused painting with an authority that likewise imbued its subjects with a sense of reality, no matter how fantastic or imaginative those subjects might be. In fictional space the supernatural could be revealed and constructed to appear as if it were an equal partner with physical reality, even though it existed only as an illusion on a flat plane. Even the artists' extraordinary skills in accomplishing feats of painting and sculpture seemed to lend

credibility to the reality of fictional content, for who but God could bestow such talent? As a tool for constructing pictorial realism, perspective enabled artists to give fictional space factual credibility, through which viewers could seemingly confirm their magical beliefs. In the last few hundred years, while science trudged along methodically explaining physical phenomena, art leveraged perspective's authority to illustrate the human desire for enigma, spirituality, and deeper meaning.

Roughly 125 years ago, however, the space of painting was beginning to undergo a gradual but drastic change (along with the space of science, through individuals like Darwin, Planck, and Einstein). Beginning with Impressionism, the deep perspectival space promoted by painters up through nineteenth century neo-classicism was gradually reduced, moving it toward the viewer and closer to the plane of the canvas itself. Through this shortening of perspective's vanishing point, art was gradually transformed from being a window into a fictional world to being an object located on the same side of the window as the viewers themselves. Aesthetic experience, through notable artists such as Paul Cezanne, Pablo Picasso, Piet Mondrian, Kasimir Malevich, and Marcel Duchamp was by the 1920s slowly aligned with objects that displaced the same real space that art's onlookers displaced. Rather than being an idealized world beyond the window of the picture plane, this new work implied that art was less about appearances and more about reality—potentially found in all those surroundings of daily life that activate an aesthetic response. "Art is there," the painter Josef Albers said, "where art seizes us"—very nearly the same as saying that art can be anything to which we respond with the familiar combination of emotions and intellect we experience in front of a painting or sculpture.

In subsequent decades of the twentieth century, this reversal of illusionist perspective received contributions from a series of artistic developments. The abstract expressionists, whose candid exposure of the developmental stages of painting—the drips, splashes, and gestures of human hand and recorded error—suggested that aesthetic experience could be located in the flawed and belabored process of an object's making. Art, their canvases argued, could be the artifact of an action in the real world.

In painting, the picture frame—a symbol of separation between art and the world—began to be minimized or eliminated altogether, and in sculpture the pedestal disappeared, removed by artists such as Anthony Caro and David Smith to emphasize that art occupied the same ground as those who experienced it. In the 1960s, painters Helen Frankenthaler and Morris Louis contributed to a flattened perspective by emphasizing materials and staining paint directly into the canvas weave, while Robert Rauschenberg and Jasper Johns began attaching physical objects to their painted surfaces. Frank Stella invented three-inch-deep stretcher bars, thus bring-

ing painting forward in space and emphasizing its object quality. Pop Art emerged, elevating real commercial products to the status of aesthetically charged icons. Later on, minimalism and installation art likewise contributed, finding artistic torque in the relative position of a viewer to the artwork being viewed, making of the two a real-time interactive event.

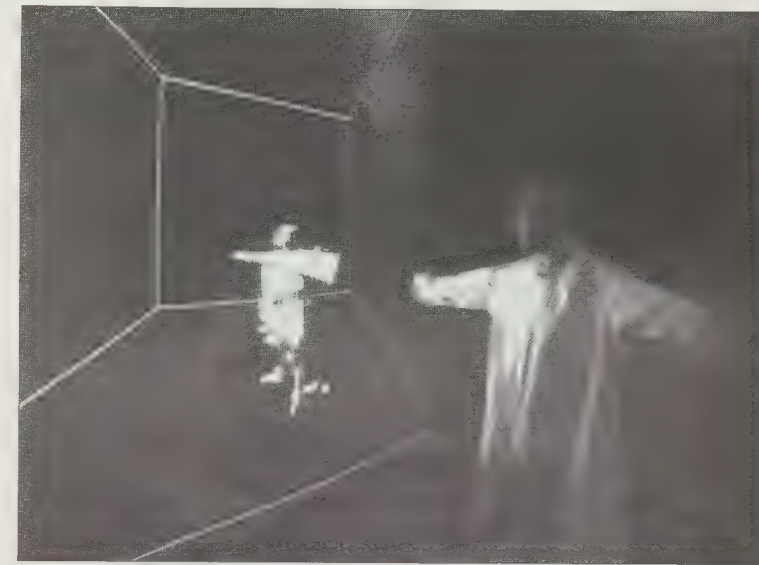
In the early 1990s the affordability of relatively powerful desktop computers, available for the first time to artists without requiring of them any institutional affiliation, catalyzed the emergence of a robust form of interactivity in art. Not surprisingly, this development mirrored advances in communication technologies, from the Internet to digital games to the array of consumer software products that emerged after personal computer ownership became widespread. Perhaps the most extreme inversion of perspectival space thus far, interactivity in art also undermined some of modernism's other maxims—among them the notion of a passive audience enraptured by privileged artistic insights. Interactivity democratized the search for art's meanings, making of it a collaboration between artist and audience—in some sense turning everyone into a researcher, an artist, and a creator.

Both active and passive forms of interactivity can be found in new art. In the active form, spectators consciously affect an



Jennifer Steinkamp, "Einstein's Dilemma," 2003
Projectors, motion sensors, computers.
"Einstein's Dilemma" addresses the powerful impact science has on society. Installed in Caltech's Athenaeum, visual explosions are triggered as scientists walk through the space.

All artworks were created for the exhibition NEURO, April 13 through June 2003, an art and science collaboration between the Center for Neuromorphic Systems Engineering at California Institute of Technology, and the Alyce de Roulet Williamson Gallery, Art Center College of Design. Photos courtesy of Art Center College of Design/Steven A. Heller.



Malcolm MacIver, Simon Penny; "Body Electric," 2003
Infrared cameras, lights, projectors, computers, speakers, custom software.
"Body Electric" is an immersive environment that asks users to perceive and navigate space as different species might.

artwork's behavior by touching or manipulating some sort of interface. Passive interactivity, on the other hand, is typically achieved via sensors that monitor spectators' movements or other variables such as body heat, leaving them to discover over time the influence they exert. In either case, the work of art is not complete without a partnership with its audience. In this manner fictional space has been completely inverted, the spectator transformed from passive voyeur to active accomplice—from being an onlooker to being a part of the work of art.

In its transition from fictional to real space, painting may have become the barometer of a larger change in the way humans perceive their world. Traditional assumptions about ourselves and the universe have slowly dissolved under the now-ubiquitous influence of science. Whereas in earlier times explanations came from myth and encapsulated everything—not the least our imaginations—in the modern world the greatest mysteries now come from science itself. Science reveals with every new discovery a real universe of bizarre proportions, extraordinary beyond Newtonian (and perspective-bound) expectations, full of quantum ambiguities. Reality, it seems, is too strange for the fictional capacities of vanishing-point perspective to contain.

Artists seek to understand the space in which they work, not only its metaphorical potential but its structural organization—hence the studies of perspective and illusion, the construction of theories for color and composition, and the analysis of materials and techniques that accompanied two-dimensional pictorialism. Artists choosing to construct their expression from an interest in real space, whether they work in two or three (or more) dimensions, are now seeking a new means of ordering, de-emphasizing the vocabulary of pictorialism that has lingered throughout the last century. Science provides a means to pursue that order, and as science asks startling questions, striking at core assumptions and uncovering new mysteries, artists are drawn to the resulting nexus of change.

Beyond the acknowledgement that they significantly enrich each others' practice, there are at least three speculations embedded in this movement to reintegrate art and science. One is that both disciplines encourage the probing of boundaries, so it is not surprising that they doubt their own divisions—the boundaries said to separate art and science. Second, inasmuch as art is the means by which humans depict worlds of meaning, imagination, and mystery, artists will be increasingly drawn to

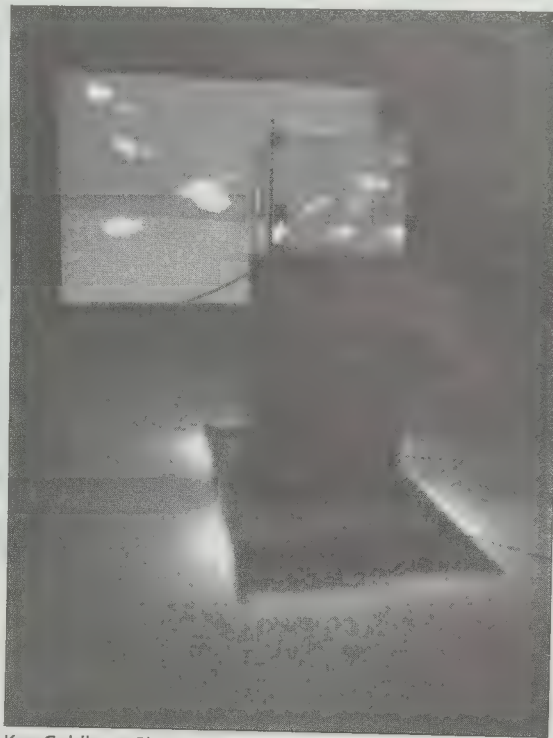
both the cultural impact of science and its exposure of reality as being stranger than fiction. And third, given our human compulsion to aspire to archetypes that are aesthetic as well as omniscient, the integration of art and science seems an inevitable path to a kind of spirituality—a fusion of conceptual curiosity and emotional wonder about ourselves and our world. This nonsupernatural spirituality may feel like a personal sense of our core, or a connection with the human fabric that stretches across time and generations. It can be not so grandiose, a fleeting glimpse of an essence or simple reverence for some new bit of knowledge. Or, it can be a swarm

of oceanic sensation that ascends to the surface of our consciousness, then just as quickly disappears, leaving us with an emotion of ephemeral insight into something deep and essential. Its most distinguishing characteristic, however, is that it finds its fountainhead in the unfolding of reality, not of fiction.

Heaven, the ultimate goal of supernatural spirituality, is pictured as a place where vital questions are answered and existence artfully provided with stately mansions and streets of gold. In heaven, were it real, one would imagine other fictional spaces to be no longer necessary—everything needed for the spirit would be present and accounted for. Heaven is described as a realm both aesthetically pleasing and intellectually omniscient—a place where knowledge is revealed and beauties uncovered. In fact, however, what mankind has always described as the divine ideals of such fictional spaces as heaven, it has ended up pursuing in real

space. What in the past would have been considered possible only through the supernatural is routine today. Humans fly, the dead are resuscitated, life is prolonged, voices “magically” transmitted. Infertile couples give birth. We travel to planets, to the homes of the gods themselves. We peer deep beneath the surface of appearances, and far into the cosmic past.

At the same time, emancipated from its historical and singular alliance with fiction, art is increasingly looking at science to understand the space in which it continues its search for deeper meanings. Appreciating the world as a place of both facts and beauty, in which the two are interwoven and indistinguishable, a place where knowledge and aesthetics, science and art, are one in the same and in no need of help from the imaginary, is in some ways like what we have come to expect of heaven. In the real world, art and science are attaining heaven the hard way—by realizing it one small ideal at a time. What better, more real, “spirituality” could there be for humans to embrace. □



Ken Goldberg, Pietro Perona; "Infiltrate," 2003
Fish tank, koi, cameras, computers, projectors, custom software. "Infiltrate" shows nature from the inside out. It uses three cameras to follow six koi in a tank, one orange and five white, and feeds tracking data into rendering software that synthesizes the inside of the tank as seen from the perspective of the swimming orange fish.

King of the Paranormal

CNN's Larry King Live has a long history of outrageous promotion of UFOs, psychics, and spiritualists.

CHRIS MOONEY

Broadcast on CNN, the July 1, 2003, installment of *Larry King Live* was a sight to behold. The program, in King's words, explored "the incredible events of fifty-six years ago at Roswell, New Mexico." What most likely crashed at Roswell in 1947 was a government spy balloon, but the panel of guests assembled on King's show preferred a more sensational version of events. Jesse Marcel, Jr., son of a Roswell intelligence officer, claimed that just after the crash, his father showed him bits of debris that "came from another civilization" (Marcel 2003). Glenn Dennis, who worked at a Roswell funeral home at the time, said a military officer called him to ask about the availability of small caskets (i.e., for dead aliens). Later Dennis, obviously

a UFO enthusiast, abruptly observed that the pyramids in Egypt had recently been "[shut down] for three or four days and no tourists going out there on account of the sightings" (Dennis 2003).

King's program didn't merely advance the notion that an alien spacecraft crashed at Roswell in 1947. It also hawked the DVD version of a recent Sci-Fi Channel documentary, "The Roswell Crash: Startling New Evidence," clips of which appeared throughout the hour. A breathy and sensationalized take on the events of 1947, "The Roswell Crash" first appeared as a tie-in for Sci-Fi's fictional miniseries *Taken*, a Steven Spielberg production tracing the impact of UFO abductions on three generations of American families. Other *Taken* tie-ins that tend to blur the line between fact and fiction include a documentary titled *Abduction Diaries*, a Roper Poll finding that Americans are ready for the discovery of extraterrestrial life, and even the launching of the Coalition for Freedom of Information, an advocacy group devoted to unearthing classified government documents about aliens (Mooney 2002). Sure enough, King's July 1 guests included two people with Sci-Fi ties: Leslie Kean, a left-wing journalist turned UFO investigator¹ who works with the Coalition for Freedom of Information, and William Doleman, a University of New Mexico archaeologist contracted by Sci-Fi to excavate the

Roswell crash site. Doleman admitted to King that his dig had not yet yielded any definitive evidence, but added that the "results" of his analysis will air on Sci-Fi in October—as opposed to, say, being published in a peer-reviewed scientific journal (Doleman 2003). [See also David E. Thomas, "Bait and Switch on 'Roswell: The Smoking Gun,'" *SKEPTICAL INQUIRER*, March/April 2003.]

Sci-Fi is an entertainment network, and can arguably air whatever it wants, including pseudodocumentaries hyping the Roswell myth. But Larry King is different. King regularly interviews senators, former presidents, and heads of state. One would expect him to hew to basic standards of journalistic rigor and balance. On July 1, however, King presided over a thoroughly biased discussion of the Roswell question that eschewed historical accuracy and gave a big boost to Sci-Fi's paranormalist marketing strategies. Project Mogul, a secret government program to develop spy balloons, counts as a strong candidate for the source of the Roswell incident (see Thomas 1995). One Roswell expert, New Mexico physicist and mathematician Dave Thomas, told me that King's program failed entirely to explain this.

Does CNN, the "most trusted name in news," take responsibility for the factual content and balance of *Larry King Live*? This article attempts to answer that question. After all, King's July 1 Roswell program was no aberration. King has hosted uncritical shows about UFOs in the past, and he probably devotes more air time to spiritualist mediums like John

Edward, Sylvia Browne, and Rosemary Altea than to America's UFO obsessives. No other serious cable news anchor treats the paranormal in the consistently promotional way that Larry King does, which more resembles the approach of Montel Williams or Jerry Springer than that of a trusted journalist.

In researching this article, I interviewed four leading skeptics who have appeared on *Larry King Live*, seeking their perceptions of why the program consistently promotes the paranormal, sometimes without airing any critical perspective at all. I also attempted to contact King or his producers to seek a response to the skeptics' criticisms. My request, however, was unmet. As a result, I have been left with no choice but to privilege the skeptical perspective, which views *Larry King Live* as a depressing example of the way that marketing values and the demand for viewers can trump journalistic responsibility. This process leads otherwise trustworthy media outlets to inflate the reputations of psychics and promoters of the paranormal because they draw in hordes of credulous viewers. CNN may be a respected news network, but in its irresponsible presentation of paranormal topics and themes, *Larry King Live* compromises that reputation.

Larry King's Paranormal Journalism

On CNN's Web site, Larry King's impressive personal page presents the sixty-nine-year-old anchor as a true lion of journalism (King 2003). King, the page notes, hosted the famous 1993 debate between Ross Perot and Al Gore over the North Atlantic Free Trade Agreement, which broke CNN records by drawing in some 16 million viewers. King also conducted "award-winning jailhouse interviews" with Karla Faye Tucker and Mike Tyson, and has won journalism accolades ranging from the Allen H. Neuharth Award for Excellence in Journalism to the George Foster Peabody Award for Excellence in Broadcasting. Indeed, over the years King has conducted interviews with pretty much anybody who's anybody, celebrities and politicians alike. Some top tier interviewees include Jimmy Carter and Bill Clinton, Mikhail Gorbachev and Vladimir Putin, and Tony Blair and Margaret Thatcher.

You might be surprised to hear that someone so decorated could be guilty of repeatedly treating a certain topic—the paranormal—in a fashion that betrays virtually all journalistic standards. If you cast a glance back at King's various shows over the years, however, you will find titles like "Is the End of

the World at Hand?," "Paranormal Warfare—A Secret Military Power?," "Is Exorcism Real?," and "Are Some Persons Programmed for UFO Contact?" interspersed with more serious programs (King 1990a, 1990b, 1991, 1992). Sometimes these shows have included skeptics, but King frequently devotes entire programs to paranormal topics with nary a

skeptic to be seen, as was the case with the July 1 Roswell program. In fact, a study by Matthew Nisbet found that even in one case where King included skeptics on his program, these doubters were granted dramatically fewer total seconds of speaking time than the paranormalists (Nisbet 2001a).

Possibly the most troublesome aspect of King's promotion of the paranormal involves spiritualism, the contacting-the-dead movement that began in the nineteenth century with the "rap-

pings" of the Fox Sisters and evolved into the televised psychic mediumship seen today on programs like *Crossing Over with John Edward* (a Sci-Fi production that originated after the channel's president saw Edward on *Larry King Live* [Ballard 2001]). Prior to his July 1 Roswell program, King's most recent foray into the paranormal was a May 16 interview with popular psychic Sylvia Browne, whose Web site attests that she is "truly on a mission from God" (Browne 2003), and who frequently dispenses explicit health advice despite her lack of medical qualifications (Farha 2003; see "Sylvia Browne: TV Psychic Sidesteps Challenge," page 41 of this issue). An excerpt from the show transcript demonstrates just how low these programs can go, and how willingly King plays along [Browne 2003b]:

King: Do you believe in angels?

Sylvia Browne: Oh, yes.

King: What are they?

Browne: They're actually the (unintelligible) that was made by God to protect us. I mean, they're not . . .

King: Bad people have angels?

Browne: You know, bad people, I've never seen bad people have angels. That's interesting you should ask that, because I've never seen angels around bad people.

King: Do they look like the drawings of angels?

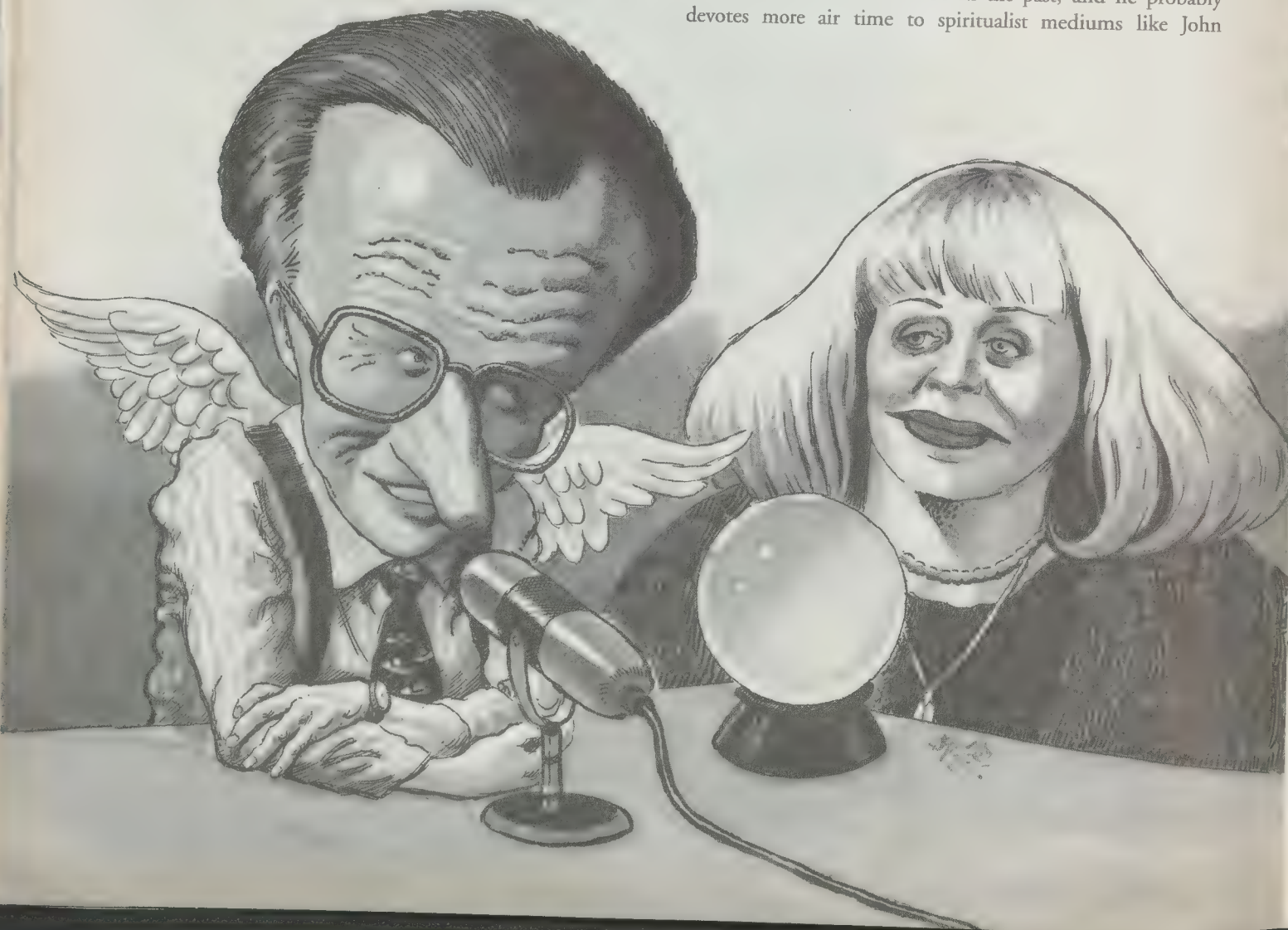
Browne: Yes.

King: They do?

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Alleged psychic Rosemary Altea says she can see the "guardian spirits" of earthlings and can travel "astrally" out of her body to points around the world.



Browne: And I didn't think they had wings. I thought that was just some stupid...

King: Sylvia, Sylvia, come on. You see people with wings?

Browne: Yes. I used to tell people they didn't have wings, Larry. And then I saw one with wings, and then I had to go back up on stage and say, I'm sorry, I lied. They have wings.

King: Why do you see them and I don't?

Browne: I don't know. You probably could see them if you wanted to. You have four of them around you.

King: To what, to protect?

Browne: To protect.

King: We have four them around us?

Browne: You have four.

King: I have four.

Browne: You have four. Some people have two.

King: I'm a good guy?

Browne: Well, that's it.

King: I've got connections, right?

Browne: You've got connections.

Browne has repeatedly promised, on the air, to allow magician James Randi to test her psychic abilities in a rigorously controlled setting, but she has not yet submitted to the test.

Browne appeared alone for the entire hour. Throughout much of the show, King allowed her to take phone calls and attempt to contact listeners' dead loved ones—a process greatly facilitated by a palpable will to believe on the part of these desperate, bereaved callers. King has invited Browne on his show numerous times in the last few years. In fact, Browne has repeatedly promised, on the air, to allow magician James Randi to test her psychic abilities in a rigorously controlled setting, but she has not yet submitted to the test. On his Web site Randi maintains a "Sylvia Browne Clock" that keeps track of how many days it has been since Browne accepted his challenge.² King, however, has shown little interest in learning whether Browne can actually do what she claims (Farha 2003).

Larry King and the Psychic Mediums

And if King's promotion of Browne rankles, it's just the beginning. Another psychic superstar of King's program is John Edward, who has appeared repeatedly, both alone and with other guests (including occasional skeptics). As CSICOP paranormal investigator Joe Nickell and others have documented (Jaroff 2001, Nickell 2001), the techniques used by Edward to convince *Larry King Live* callers that he can contact the deceased turn out to be quite mundane. Using a process called cold reading, Edward essentially goes fishing for information. Talking quickly, he throws out common causes of death and

other vague data, and then waits for callers to take the bait and suggest he's on to something. Edward also asks questions, makes educated guesses, and feeds off reactions for more information. His statements are often wrong, and when they're right it's only in a vague way. But the willingness of callers to seize upon Edward's "hits" and ignore his "misses" makes his performance seem believable. (See also James Underdown, "They See Dead People—Or Do They?" *SKEPTICAL INQUIRER*, September/October 2003.)

King's uncritical presentation of spiritualists like Browne and Edward, as well as James Van Praagh and Rosemary Altea, reached such a pitch in 1999 that two leading skeptics, CSICOP's Paul Kurtz and Joe Nickell, sent a complaint letter to King and one of his producers (Kurtz and Nickell 1999). "We must protest," wrote Kurtz and Nickell, "your repeated promotion of 'spiritualism' . . . without providing a contrary view," continuing:

One must wonder if people would really want the touted "communications" from their deceased loved ones if they knew the facts about spiritualism's history of fraud and deception, or even that the techniques used by mediums on your several shows are well known and easily discredited.

If spirit communications are not genuine, we are often asked, nevertheless what harm is there in the solace provided by the pretense? The answer is that falsehoods have consequences. Magician Harry Houdini catalogued many of them—"the suffering, losses, misfortunes, crimes and atrocities"—of spiritualistic deception. We have personally witnessed the consequences to people's self-respect when they realized their most sacred beliefs had been manipulated and trivialized.

Kurtz and Nickell concluded by noting that while "we do not advocate censorship, we do invite fair-minded journalism."

According to Kurtz, the letter resulted in a telephone "shouting match" between Kurtz and King's producers, who defended their presentations on the grounds that, in Kurtz's words, "everybody knows it's entertainment." Kurtz disagreed, explaining to me that since Larry King has a reputation as one of TV journalism's leading figures, even his treatments of the paranormal will inevitably be taken as "authoritative and newsworthy" (Kurtz 2003c). Indeed, it's almost as if the sheen from King's interviews with senators and former presidents rubs off on the UFO promoters, psychics, and quacks.

So what's going on at *Larry King Live*? Why are psychics, mediums, and UFO believers permitted to speak without interruption to King's vast audience? Among the skeptics I interviewed, all of whom have appeared at one time or another on *Larry King Live*, a consistent theme emerged: The quest for ratings is the only possible explanation for King's journalistic transgressions. "Having the spiritualists on must be for him very popular shows. Whatever he uses for feedback to tell him this, it must really work. Otherwise he would drop it like a hot potato," said Nickell (Nickell 2003). Magician James Randi was even more explicit: "This is a marketing thing. They want

sponsors, they will get sponsors and they will keep sponsors if they put this kind of material on, because it attracts viewers. That's the bottom line" (Randi 2003).

Michael Shermer, of *Skeptic* magazine, has also appeared on *Larry King Live* and confirms the views of Kurtz, Nickell, and Randi. Of King's presentation of the paranormal, Shermer notes: "I've actually asked Larry about this. Specifically, 'Do you believe this stuff?' And he said, 'For the most part, I'm a skeptic like you,'" recalls Shermer. "And I've asked his producers, 'Why do you put this stuff on?' And they said, 'Cause it gets great ratings, it's good television'" (Shermer 2003). Since ratings inevitably drive the media's presentation of the paranormal, Shermer argues, it's incumbent upon skeptics to create programs that stand an equal chance of drawing large audiences. Shermer's own show, *Exploring the Unknown*, presented a skeptical perspective for sixty-five segments on the Fox Family Channel. And with Showtime's late night show *Penn & Teller: Bullshit!*, the Discovery Kids Channel's *Mystery Hunters*, and the Discovery Science Channel's *Critical Eye* (produced with the help of CSICOP and *SKEPTICAL INQUIRER*), the skeptical perspective does seem to be finding its way onto television more frequently than it did during the paranormal-obsessed 1990s.

Shermer's strategy certainly describes one way of combating the paranormal messages spread on *Larry King Live* and other programs. But should ratings alone dictate the treatment of the paranormal on a television news network like CNN? Shermer opines that "Larry King is not in the news department, he's in the entertainment department, so he's not required to have any journalistic ethics, and he doesn't" (Shermer 2003). But *Larry King Live* will sometimes transition back and forth between news reporting and paranormal "entertainment" within the course of the very same program (Nisbet 2001b). When this happens, how are viewers supposed to tell the difference?

In any case, Shermer's recollection of his conversation with King and his producers seems consistent with Kurtz's account of his own interaction with King's producers. Still, I wanted to be sure these first-hand accounts accurately represented the institutional view of *Larry King Live*. So I contacted King's publicist, Erin Sermeus, identifying myself as a writer with the online version of *SKEPTICAL INQUIRER* magazine. Sermeus returned my initial call, and in our conversation I summarized for her the criticisms of *Larry King Live* that I had been hearing from leading skeptics.

Besides noting—correctly—that shows devoted to psychics comprise only a small percentage of total *Larry King Live* programming, Sermeus did not provide much substantive response. However, she said she would get back to me in a few days with something more thorough. She never did. An e-mail, a follow-up phone call, and a call to Sermeus's cell phone all went unreturned. After waiting a week beyond my original

article deadline, I decided to go ahead with this piece without a formal response from *Larry King Live*.

Where does that leave matters? If the past is any indication, we will continue to see unbalanced presentations of paranormal topics on *Larry King Live*, sometimes with token skeptics included, sometimes not. Barring a sudden change of heart at CNN, things will proceed as usual.

At this point, Michael Shermer's suggestion—that skeptics try to create their own programs to get their messages into the media—does sound pretty attractive. Granted, it basically concedes that skeptics stand little chance of convincing shows like *Larry King Live* to change their practices. And yet, these practices themselves are not set in stone. After all, who knows how our culture's approach to the paranormal—both journalistic and otherwise—will change?

CSICOP's Paul Kurtz and Joe Nickell sent a complaint letter to King and one of his producers. According to Kurtz, the letter resulted in a telephone "shouting match" between Kurtz and King's producers, who defended their presentations on the grounds that, in Kurtz's words, "everybody knows it's entertainment."

We have already seen skeptic-friendly media programs. Perhaps one day the skeptic movement will produce another Carl Sagan—a media personality of sufficient stature to appear on *Larry King Live* for a whole hour uninterrupted, the way Sylvia Browne and John Edward currently do. Then maybe Larry and the skeptic will exchange a few jokes at the expense of psychics and UFO believers. Indeed, perhaps the skeptic will even ask King to repent for his show's previous transgressions, and King will go along. An on-air confession: Now *that* would make for great ratings.

Notes

1. Before becoming involved with the Coalition for Freedom of Information, Kean directed the Burma Project USA, and wrote several major articles for the liberal-left *Nation* magazine, including a lengthy 1996 article with Dennis Bernstein entitled, "People of the opiate: Burma's dictatorship of drugs." By 2000, however, she had changed courses significantly, authoring a thoroughly unskeptical article for the *Boston Globe* entitled, "UFO theorists gain support abroad, but repression at home: Study by French officials outline unexplained sightings, US military safety aspects combine to boost believers."

2. The clock can be viewed at www.randi.org/sylvia/index.shtml.

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Sylvia Browne

TV Psychic Sidesteps Challenges

Popularized by Larry King and Montel Williams, self-proclaimed psychic Sylvia Browne has reneged on promises to be tested for her extraordinary claims of communicating with the dead and "seeing" health problems. Is she really psychic? Would the medical profession consider her to be practicing medicine without a license? Do the media care?

BRYAN FARHA

One of the most popular "spiritual mediums" in the world is Sylvia Browne.

Sylvia's Web site (www.sylvia.org) states:

Sylvia began her professional career as a psychic on May 8, 1973, with a small meeting in her home. Within one year her practice had grown very large and she decided to incorporate her business as the Nirvana Foundation for Psychic Research. Wanting to make her work as professional as possible, then as now, Sylvia maintains required business licenses, is a member of a national consumer protection agency, and donates a lot of time to charitable organizations and working with police. Her business has remained in the same general vicinity since beginning her work.

Sylvia's family line includes several practicing psychics and mediums. Her maternal grandmother, Ada, was an established and respected counselor and healer in Kansas City, Missouri. This familial psychic

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talent has also passed on to her son Christopher Dufresne. There seems to be a genetic component necessary to create exceptional psychics, Sylvia's bloodline carries that predisposition to excellence. As Sylvia says, "Anyone can learn to play the piano, but not everyone is a concert pianist." (2003)

Sylvia "diagnoses" health problems, purports to communicate with the dead, and even claims to have proven there is an after-life. Her recent books include *Contacting Your Spirit Guide* and *Past Lives, Future Healing: A Psychic Reveals the Secrets to Good Health and Great Relationships*. For several years, she has been popularized by TV talk-show hosts Montel Williams and Larry King. Williams—who has hosted Sylvia more than seventy times since 1995—will have absolutely no part of a skeptical perspective. Larry King has included skeptics as guests on two of her three recent appearances during the past three years. But neither Williams nor King has shown the slightest interest in checking out her monumental claims. And, as far as I know, neither is interested in whether Sylvia's health advice causes people to delay appropriate treatment or to undergo needless tests to look for nonexistent problems that Sylvia "sees."

For health questions, callers can get a "reading" from Sylvia for only \$700 by phone or \$750 in person, according to her Web site (2003). Does that sound like proper commercial activity for someone who has no medical license, just a master's degree in English literature?

Sylvia in Action

On September 3, 2001, Sylvia was challenged on *Larry King Live* by James Randi, the conjurer/skeptic who heads the James Randi Educational Foundation (JREF), a nonprofit organization founded in 1996 to "promote critical thinking by reaching out to the public and media with reliable information about paranormal and supernatural ideas so widespread in our society today" (Randi 2003). During the program, Sylvia claimed that she had worked with 350 doctors and had cured a child of seizures. When asked how he thought Browne worked, Randi replied that she asks questions, makes guesses, offers suggestions, throws out words, waits for answers, and builds on what she gets—a method commonly referred to as cold reading. Randi also pointed out that people tend to remember what seems to fit and forget what does not. During the program, she demonstrated her technique to one caller (2001):

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Sylvia Browne

Caller: Sylvia and Larry, I enjoy you so very, very much. I listened to you for years and I just wanted to get on for a long time. Randi, I feel sorry for you as well, because we have to believe in something. My question is, Sylvia, I never had a chance to say goodbye to my husband. And I am wondering if he knows how much I loved him.

Browne: Not only did he know that, but what was the—clot or whatever that let loose? Because it looks like there was something about a clot.

Caller: Yes, he had a severe brain hemorrhage at the very last minute.

Browne: Because it looks like it was, not only that, but this was massive.

Caller: Yes, it was.

Browne: Yeah.

Caller: Right through the top of his head.

Browne: And he really—you know, there are so many times, like when I lost so many people. I don't care how many times if you can say good-bye, you never have enough good-byes. But see, aside from Randi, he hears everything you say, especially when you talk to him.

Caller: Well, I don't really know whether I can say anything to him. There are people like that. But I feel sorry for them. Because we have to believe.

King: I thank you, ma'am. (Turning to Sylvia): Now, help me with something.

Browne: Yes?

King: Did you see that clot?

Browne: I saw the clot letting loose.

King: How do you explain? . . .

Browne: I don't know. It's like Randi said one time to one of the psychics, a lot of psychics just say chest. Of course, because a lot of people have chest problems. But not everybody has a massive embolism.

King: How would you explain that. A massive . . .

Browne: I know what he is going to say, it's a guess.

Randi: Larry, you're asking me to explain specific things. I don't know who this woman is who called. I don't know whether she is a ringer. I'm not saying she is, and I'm not suggesting that.

Browne: Oh.

Randi: But it is possible. There are many possibilities here. We have made a lucky guess, and we have hit. An embolism. A clot.

King: There are many possibilities. Is one of them—Randi, is one of the possibilities Sylvia is right?

Randi: Absolutely.

Randi was actually being generous. A clot might be involved in a heart attack, a stroke, or a few other rapidly fatal conditions. Because heart attacks and strokes are among the most common causes of sudden death, the word "clot" had a fairly good chance of being correct. However, in this case it was not. Although Browne and King seemed to think that Browne's "diagnosis" was on target, it actually was dead wrong. The caller said the problem was a severe brain hemorrhage. A clot is just the opposite of a hemorrhage. As Randi (2001) notes on his Web site:

Now, to me, this sounds as if the caller is describing an impact of some sort to the top of the head! Clots don't go through the top of the head. They originate inside the head and stay there. Notice, too, that the term "embolism," which was introduced by Sylvia as applying to the cause of this death, and never by the caller, refers to a blocked blood vessel, and could not apply here. She said, amplifying her reading—the caller had already been disconnected by that time—that I claimed "psychics" frequently refer to "chest problems" as a cause of death, while "not everyone has a massive embolism." She then predicted what I would say about this remarkable "hit," that I would call it a guess. She was wrong; I say that it's a dead miss. And it is. No, not everyone has a massive embolism, nor a clot, both of which Sylvia put forth as the cause of death, and this man had neither.

An M.D. friend said that in his opinion, Sylvia is not just full of baloney but also dangerous. She mentioned to one caller that she should check the "bilirubin," which she told King "is a liver enzyme." In fact, bilirubin is not a liver enzyme but a degradation product of human hemoglobin. This is routinely checked when blood tests are done. No need to check it separately, as any elevation of bilirubin will give the very obvious clinical appearance of jaundice. You just have to look in the person's eye to see that. And there is no test for Epstein-Barr disease related to the examination of fecal matter, as Sylvia, in her vast medical expertise, offered to a caller. And she prescribed the drug Tegretol, as well, for another caller's disorder. This type of medical advice, which by law Sylvia cannot offer, is dangerous as it can mislead the caller. Who is she to give medical advice? Larry King was amazed at her facility with medical terms. As Randi points out, facility does not necessarily equate with accuracy.

Later in the program, Browne said that Randi needed to see a doctor because he had a problem in his left ventricle (the chamber in the heart from which the blood is squeezed out into the body's general circulation). Soon afterward, Randi saw a cardiac surgeon, who found no problem. If you think this example is benign, consider that most of Sylvia's readings are with people who believe in her alleged psychic ability and therefore take her seriously. Health-related readings like this are commonplace with Sylvia.

One Evasion after Another

The James Randi Educational Foundation offers a \$1,000,000 prize to anyone who can show, under proper observing conditions, evidence of any paranormal, supernatural, or occult power or event. The prize is in the form of negotiable bonds held in a special investment account. All tests are designed with the participation and approval of the applicant. In most cases, the applicant will be asked to perform a relatively simple preliminary test of the claim, which if successful will be followed by the formal test. Preliminary tests are usually conducted by associates of the JREF at the site where the applicant lives. Upon success in the preliminary testing process, the "applicant" becomes a "claimant." So far, no one has ever passed the preliminary tests (Randi 2003).

Sylvia has promised three times to take the test. On March

6, 2001, *Larry King Live* hosted a discussion about criticism aimed at medium John Edward, who hosts *Crossing Over*. Sylvia and another alleged psychic, James Van Praagh, participated together with skeptics Leon Jaroff and Paul Kurtz and three others. During this program, Sylvia insisted that Kurtz had a prostate problem, which Kurtz denied. Jaroff urged Sylvia and Van Praagh to take Randi's "million-dollar challenge," and Sylvia agreed to do so (*Larry King Live* 2001):

Browne: I have never been offered this challenge.

King: You would take it?

Browne: I would take the challenge. I have tried to run around the table—[Randi] ran away from me.

King: She will meet with Randi and take the challenge.

Browne: He ran away from me.

Browne failed to contact Randi, but on the September 3 show, she told Randi she would take the test.

"An M.D. friend said that in his opinion, Sylvia is not just full of baloney but also dangerous...this type of medical advice, which by law Sylvia cannot offer, is dangerous as it can mislead the caller. Who is she to give medical advice?"

King: Randi has offered a million dollars in the past to those who would take his challenge. Would you first—let's start with Randi—explain what the challenge constitutes? You will pay a million dollars if . . . ?

Randi: A million dollars in negotiable bonds, Larry, to any person or persons who can provide evidence of any paranormal, occult, or supernatural event or ability of any kind under proper observing conditions. It is that simple.

King: Okay, and the observing conditions would be?

Randi: It would depend upon what the claim is. I have got a whole outline right here that will tell Sylvia exactly what the test would be if she agrees to take the test.

King: Sylvia, in the past you have not agreed to this.

Browne: Well, I don't even want his million dollars. I don't want his million dollars. I mean, the reason I came on is because he kept you know, my Web site, yeah, yeah, and said I would never come on and face him. But I don't care about his million dollars. I mean, I don't need his million. . . .

King: Are you willing to take his test?

Browne: Yeah, whatever test it is.

After Randi suggested the specific type of psychic ability he would test, Sylvia agreed: All that was needed was for her to contact Randi. But by April 2003, she had made no contact. On May 16, she appeared again on *Larry King Live*, this time as the only guest. As usual, the program began with King's mostly unskeptical questions plus phone calls from viewers who sounded like true believers. About forty minutes into the show, I managed to get past the screeners by telling them I wanted to ask about "my dead cousin." I'm not proud of being deceptive, but I don't believe the screeners would have let me through if

they knew that I would question her about Randi's test. As far as I know, nobody has ever been able to do this while she was on the air. Here's what took place on that *Larry King Live* (2003):

King: Oklahoma City, hello.

Caller (me): Sylvia, 620 days [ago] on Larry's show, you agreed to take James Randi's \$1 million paranormal challenge, and on a later show you even agreed to the specific terms of the test.

Browne: Yes, but let me tell you something. I also found out that he won't put it into escrow. He won't put the money into escrow.

Caller: You agreed to the terms of the test.

Browne: No, not until he puts the money into escrow. I mean, why would I do it when the money can't be validated?

Caller: Have you contacted James?

Browne: I don't want to contact him. I already know about this Russian person who the lawyer contacted and said he won't put it into escrow.

Caller: Okay, so you agreed 620 days ago to take his test.

Browne: I'm not going to do that—I'm not going to do that if he doesn't have the money.

Caller: If I can arrange for James to come up with the money, would you take the test?

King: You said you would.

Browne: Yes, yes, I will. But if he won't come up with the other girl, why would he come up with me?

King: If you come up with it, sir, she'll do it.

Caller: And will you arrange for it, Larry?

King: Sure.

Caller: You got it.

King: Be happy to do it.

Promise number 3, this time from Sylvia and Larry King: King will arrange for the testing, and Sylvia will take the test if the money *she previously dismissed as unimportant* can be validated. Randi, who has posted a "Sylvia's Clock" box on his home page, corrected my figures. Sylvia had agreed to take the test 808 days before I had called—620 was the number of days since she had agreed to the specific protocol.

On May 18, Randi e-mailed me a scanned copy of the document from Goldman, Sachs & Company stating that the JREF prize money contained \$1,054,656.70. I immediately wrote to Larry King, with copies to Randi and Sylvia, and Randi sent the following letter to both by certified mail:

Ms. Browne:

Though proof of the JREF prize money is easily available on request, you have not made any such request. Your May 16 appearance on the *Larry King Live* TV show seemed to indicate that you were ignorant of the facts, and since we are an educational foundation, we therefore enclose a notarized copy of the account status showing the balance in a special "James Randi Educational Foundation Prize Account" in excess of one million dollars. Also enclosed is a formal statement from the agency holding these assets, verifying that the funds are in place. I'm sure that you are aware of the grave legal consequences that would result against the JREF if either of these documents were to be found false or altered.

As you are also aware, we have legally committed ourselves to awarding this prize money to anyone who successfully passes both the preliminary and then the formal test, as agreed to between the applicant and the JREF. This is described on our Web page, which also clearly states all the conditions for assuring that the prize money will be awarded if the conditions are met. Since you have already heard and accepted the terms and protocol of the test, and your understanding and agreement have been broadcast across the world via CNN, it only remains for you to give us a date upon which we can conduct the test.

One caveat: Several of the persons who responded more than a year ago to our request for suitable subjects—one of which would be chosen at random—have since died. It would be necessary for us to re-issue the request, of course, and that would mean that a suitable date would have to be set sometime in July, but no sooner.

Now that this issue of the prize money has been resolved, and there can no longer be any impediment to your involvement, we anticipate hearing from you with a renewed acceptance of our challenge. Of course, if you are afraid of taking the test, or you are aware that you cannot pass a simple double-blind test of your claims, you may wish to further obfuscate the matter by producing more excuses and problems. That's entirely up to you.

Since Larry King has agreed to "arrange" that you be assured of the existence and availability of the prize money, a copy of this letter is being sent to him for his information. (Randi 2003)

But on May 22, Sylvia refused to accept Randi's certified letter. On May 26, I e-mailed Sylvia a copy of Randi's letter and asked "any office personnel" who receive it to make sure she reads it herself. On May 27, I left a telephone message for Larry King's producers, to which they have not responded.

The Bottom Line

Sylvia Browne would like people to believe she has the psychic ability to communicate with the dead and to diagnose their ailments. She has broken three promises made on live, international television to take the JREF One Million Dollar Paranormal Challenge. More than two years have passed since her first promise. I don't believe she ever intended to take the test. Do you think any talk-show hosts will care?

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Neither Intelligent nor Designed

Evolution succeeds where "Intelligent Design" fails in describing the natural world.

BRUCE and FRANCES MARTIN

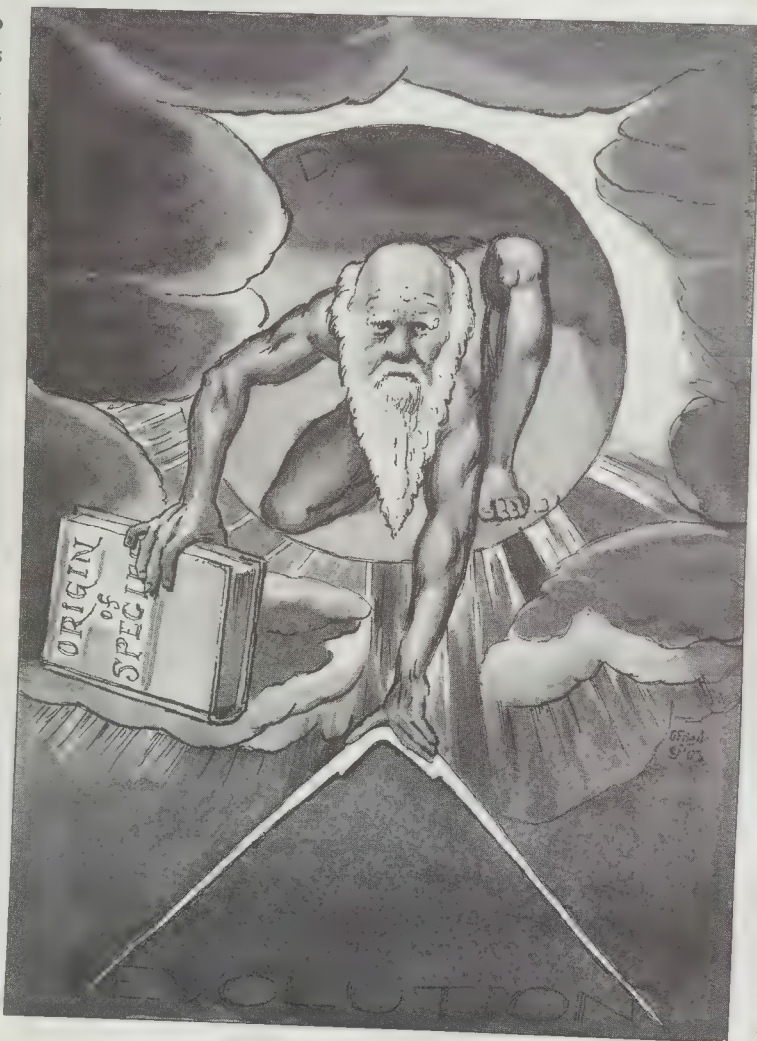
Are you puzzled by the appearance of the words "Intelligent Design" in recent anti-evolution discourse? Most of us lack time to follow the history of this term or its analysis in the expert volumes produced by Robert T. Pennock and others (see references). But as the phrase Intelligent Design shows up more and more often in public debate over science education, skeptical citizens need a handle on this topic. [For recent previous articles on this subject in the *SKEPTICAL INQUIRER* see Mark Perakh, "Intelligent Design: Dembski's Presentation Without Arguments," November/December 2002; Massimo Pigliucci, "Design Yes, Intelligent No," September/October 2001 (Science and Religion issue); and the section "Evolution

and Intelligent Design" in the World Skeptics Conference report, September/October 2002.]

Intelligent Design is a well-worn concept in theological argument. Since ancient times, the harmony and complexity of natural organs and systems have served as "proof" for the existence of God. In modern times before Darwin (1859), William Paley (1802) was the most famous proponent of this idea. Remember the watch found on the heath? Paley supposed that, just as the discovery of such an intricate mechanical setting would be proof of a human designer, so the intricate mechanisms of the natural world, such as the human eye, prove the existence of a benevolent, divine designer. Today design has new currency in the latest anti-evolution thrust. Pennock gives a list of its academic sponsors (Pennock 1999, 29) and cites Philip Johnson as "the most influential new creationist and unofficial general" of the Intelligent Design school. Johnson is a retired professor of law at the University of California at Berkeley and author of *Darwin on Trial* (1991) and *Defeating Darwinism* (1997). Since the word *design* itself implies plan or purpose, it appears redundant to say "intelligent design" unless one means to imply intelligence of the highest order or divine intelligence. Despite its abstract aura, the origin of the term is undeniably religious.

By their own definition, creationists believe that the world in general, and mankind in particular, are designed and exist for a divinely ordained purpose (Pennock 2001). Therefore, creationists reject the possibility that new species appear through evolution by common descent, which proceeds with-

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out a preordained purpose. They offer as *the* alternative Intelligent Design: the purposeful fashioning of each species by an intelligent designer—by implication God. Like its forerunner, creation science, this movement presumes that by undermining Darwinism they ensure Intelligent Design reigns as the sole available alternative, ignoring numerous other creation myths. A full defense of evolution is available elsewhere; our purpose in this short article is to cite some cases incompatible with Intelligent Design.

Does the real world show evidence of wise, omniscient design? To be plausible, an argument must take all the facts into account. The scientific study of biology shows us that existing species have serious flaws, belying claims of a beneficent creator. Intelligent design spokesmen ignore vestigial organs, anatomical inefficiency, destructive mutation, the sheer wastefulness of natural processes, and the findings of molecular genetics. The constant interplay of random mutations honed by selection pressures during evolution produces many instances of poor design. What follows are a few of the less technical of the hundreds of examples of flaws noted by paleontologists and other students of evolutionary processes.

Vestigial Features

Darwin was not only convinced by the success of evolution in explaining numerous instances of common descent, but also by its ability to account for vestigial organs, "parts in this strange condition, bearing the stamp of inutility." These organs are of little or no current use to an organism but are probable remnants of an earlier form from which the organism evolved. Intelligent Design has no explanation for these organs. As Stephen Jay Gould has put it, "Odd arrangements and funny solutions are the proof of evolution—paths that a sensible God would never tread but that a natural process, constrained by history follows perforce" (Gould 1980; Gould in Pennock 2001, 670). Let's look at some examples.

Cockroaches and other insects may grow an extra set of wings, as did their fossilized ancestors. Unlike most other

snakes, boa constrictors possess small vestigial hind legs. Crabs possess small useless tails under their broad, flat bodies, remnants of some ancestral form. Flounders lie flat on the sea floor and in the adult both eyes are on the same side of the head, but when young the eyes are on opposite sides of the head and one moves to the other side! The earlier stage is a clue to an evolutionary path. The result is a wrenched and distorted skull.

The frigate, a non-aquatic bird, does not benefit from the webbing on its feet. In flightless birds the number of usable limbs is reduced from four to two with the presence of two non-functional limbs. Penguins possess hollow bones although they do not have the same need for minimal body weight as flying birds. Otherwise fully aquatic animals such as sea snakes, dolphins, and whales must rise to the surface to breathe air. Modern whales exhibit several non-functional vestigial traits. Fetuses of baleen whales bear teeth that are absorbed as the fetus matures; adult baleen whales do not have teeth.

Paleontologists proposed that whales had evolved from land mammals with legs, and therefore, in an example of its predictive power, the theory of evolution forecast that legs would be found on fossilized whales. In recent years the evolution of whales from now extinct land mammals has become well documented through newly found fossils from the Eocene epoch, about 50 million years ago (Wong 2002). The fossilized whales contain well-defined feet and legs. In modern adult whales, the front legs have evolved into flippers and the rear legs have shrunk so that no visible appendages appear. Hindlimbs still appear in the fetuses of some modern whales but disappear by adulthood. Externally invisible, vestigial diminished pelvic bones occur in modern adult whales. Evolution accounts for these useless vestigial elements as leftovers in the development of whales from land mammals, but they remain unaccounted for by Intelligent Design.

Anatomical Inefficiency

Some anatomical features that may be useful to a creature do not show efficient design one could term intelligent. They testify instead to the process of natural selection. Tails have a widely varied role in mammal bodies. They appear essential for monkeys, but the small, wispy tail in a large elephant seems useless. Tails are absent in adult apes and humans, except they appear in early embryos and are residual in the coccyx at the end of the vertebra. In some human babies a residual tail is clipped at birth.

Why should moles, bats, whales, dogs, and humans among others possess forelimbs based on the same bones that have been adapted in each case unless inherited from a common ancestor? Starting from scratch, an engineer could do a better job in each case. In pandas a normally small bone in the wrist has undergone significant enlargement and elongation so it is opposable as a thumb to the other five fingers, enabling them

to strip leaves from a bamboo stalk (Gould 1980; Gould in Pennock 2001, 669). To achieve this feat, the thumb muscles normally assigned to other functions have been rerouted. It is difficult to see how this anatomical architect would receive another commission.

The early embryos of most animals with backbones have eyes on the sides of the head. In those such as humans that develop binocular vision, during development the eyes must move forward. Sometimes this forward movement is incomplete and a baby is born with the eyes too far apart.

In mammals the recurrent laryngeal nerve does not extend directly from brain to larynx, but upon reaching the neck bypasses the larynx and drops into the chest where it loops around a lung ligament and only then retraces up to the larynx

Why should moles, bats, whales, dogs, and humans among others possess forelimbs based on the same bones that have been adapted in each case unless inherited from a common ancestor?

in the neck. While a one-foot length of nerve would be required for the direct route from brain to larynx in giraffes, the actual length of the doubled-back nerve from the chest of giraffes may reach twenty feet (K.C. Smith in Pennock 2001, 724–725).

There are many features of human anatomy we might wish were better designed. Our jaws are a little small to accept wisdom teeth that are often impacted and may need pulling. The openings of our tubes for breathing and swallowing are so close that we often choke. In humans the appendix serves no apparent purpose, but it is infection-prone, leading to inflammation and potentially fatal appendicitis. In men the testes form inside the abdomen and then drop through the abdominal wall into the scrotum, leaving two weak areas that often herniate, requiring surgery to relieve pain. Also in men the collapsible urethra passes through the prostate gland that enlarges in later life and impedes urine flow. Anatomists cite many more examples of such inefficient or useless structures, such as nipples in male primates.

Creationists often cite the human eye as a model of perfection for which Darwinism cannot account, claiming that such a complex organ could not be created by natural selection. But throughout the animal kingdom eyes have evolved many times, presumably beginning with plentiful photosensitive material followed by a stepwise incremental buildup over generations to the current organs. And the human eye is far from a model of perfection. In all vertebrate eyes the "wire" from each of three million light-sensitive retinal cells passes in front of the retina, and the collection is bundled into the optic

nerve, creating a blind spot. This set-up is just the reverse of what any designer would construct: wires leading away from the backside, not light side, of the light-sensitive cells (Dawkins 1987). On the other hand, the wires do lead from the backside of the separately evolved eyes of the squid, octopus, and other cephalopods. Why does the designer favor squid over humans?

Instead of the efficiency and elegance one expects from Intelligent Design, we see numerous vestigial characteristics and instances of poor design. Such anomalies are both expected and accommodated by evolution. Only evolution offers a self-contained explanation of why more than 99 percent of the species that have lived on Earth are extinct. What sport does a benevolent, omniscient, and omnipotent deity receive from visiting on humans and other mammals all sorts of afflictions including parasitic bacteria, viral diseases, cancer, and genetic diseases?

These and many other examples suggest that any Intelligent Design must have been undertaken by a committee of fractious gods who could not agree. Taken at face value, invocation of Intelligent Design supports an argument for polytheism.

Of course creationists might respond to these and other examples by saying that the ways of God are mysterious and inscrutable, and that we are not wise enough to comment on the means by which he achieves his ends. If anyone offers this argument, what gives him license to propose Intelligent Design as the means by which God achieves his ends? Such a personal view is patently religious, and does not belong in any science classroom.

Destructive Mutations

The study of molecular evolution strongly reinforces and extends the classic whole animal conclusions for evolution, while appearing whimsical at best for an intelligent designer. Modern evolutionary theory regards genetic mutation in the DNA of a species as the source of favorable variations that nature selects for their value in aiding the survival of an individual. But mutation occurs randomly, and in most cases the variation is harmful and results in miscarriage, deformity, or early death. Such mutations are

passed from one generation to the next, sometimes lurking in recessive genes until they meet a recessive partner. One example is cystic fibrosis, which causes mucus buildup in lungs, liver, and pancreas. Sickle cell anemia results in poor blood circulation, general weakness, and when inherited from both parents, painful crises owing to sickling and clumping of the red cells. Phenylketonuria prevents infant brain development. Muscular dystrophy wastes muscles and often leaves the victim helpless. In other cases such mutations are dominant. Huntington's Disease causes gradual deterioration of brain tissue in middle age.

Hypercholesterolemia causes heart disease due to cholesterol build-up. Neither intelligence nor design seems at work in producing such cruel mutations, though modern evolutionary theory fully accounts for nature's fickleness.

Discoveries of Molecular Genetics

In the genetic material, DNA, the sequence of four nucleic bases furnishes three-letter code words for the sequence of twenty amino acids that occur in proteins. Owing to similarities among the properties of some of the twenty amino acids, substitutions may occur without consequence for proper protein folding and function. For many animals it has proved possible to follow the sequences of both nucleic bases in DNA and amino acids in proteins to spot the changes that have occurred over time. One example is the blood protein hemoglobin, which is a tetramer composed of two alpha and two beta

chains working in concert to bind four oxygen molecules. For the beta chain of hemoglobin, the number of amino acid differences compared to that in normal adult humans of 146 amino acids appears in parentheses after the listed animal: gorilla (1), gibbon (2), rhesus monkey (8), dog (15), horse and cow (25), mouse (27), chicken (45), frog (67), and lamprey (125) (Campbell 1987). Clearly, species more closely related to man have fewer differences from humans in their hemoglobin. Since each amino acid substitution requires millions of years to occur, a time scale for branching descent from a common organism according with evolutionary theory is more probable than creation by an intelligent designer.

The known library of DNA and protein sequences is now so

huge that numerous comparisons between organisms are possible. If evolution had not already been elaborated by Darwin, we would be led to it by the more recent results of substitutions in molecular sequences. Many amino acid substitutions result in inactive mutant proteins that are not further elaborated by the organism, if it survives the mutation. On the other hand, many substitutions do not impair function and result in amino acid sequence variation of a functional protein, as in the example of the beta chain of hemoglobin above. Furthermore, in humans there are more than 100 amino acid substitutions in the 146-amino-acid beta chain of normal adult human hemoglobin that still yield a functional protein, and most carriers are unaware that they bear a hemoglobin variant. On the other hand, the substitution of only the third amino acid in the beta chain of human hemoglobin gives rise to an aberrant hemoglobin that aggregates within and produces sickling of the red cell with consequent reduced oxygen-carrying capability. This kind of trial-and-error probing involving numerous inter- and intra-species amino acid substitutions has evolution written all over it; it is very difficult to ascribe any design or anything intelligent to this process.

Human Nature

Is it any more than an overweening human ego that proposes intelligent design for such a poorly designed creature? In this egoism, creationists confirm in a perverse way that they have great difficulty rising above their animal origins. It is by reducing influence of ego that the nobler aspects of human nature emerge in humanistic values, values which have been appropriated by some religions.

Of course, evolutionary history fails to induce the warm and fuzzy feeling inspired by Intelligent Design. People would rather believe in a benevolent creator who cares for them. Evolution offers no mercy for the individual or species that lack the traits enabling them to compete in the struggle for food or adapt to changing environments. Fossil evidence shows the number of species that have failed these trials. An Intelligent Designer would create only successful species, but evolutionary theory can account for the many unsuccessful ones. If Intelligent Design fails so badly to account for the real world, aside from the emotional appeal of a wise providence, is there any justification for its continued promotion?

Addendum: The Law of Evolution

We end with a comment on the status of evolution—as fact, “just a theory,” or something in between. In the physical sciences there are many observations or facts that have given rise to generalizations: two of these are the law of conservation of matter and the law of definite proportions (which states that when two or more elements combine to form a compound they do so in definite proportions by weight). The statements of facts and their convenient generalization to laws are expressed in terms of macroscopically observable and weighable quantities. The over-

arching explanation for these laws is achieved in atomic theory, which is expressed in terms of invisible atoms and molecules. No one thinks that atomic theory is “just a theory,” for it possesses extraordinary explanatory power and provides the context in which many of the conveniences of our civilization depend. Thus we proceed from many observations or facts to their generalization in terms of laws, both levels macroscopic, to a theory expressed in terms of invisible entities.

If we now apply this scheme to biology, we see that the concept of evolution is at the law level, as it summarizes the results of a large number of observations or facts about organisms. The analogous theory is natural selection or other means by which evolution is achieved. Unknown nearly 150 years ago to Darwin, explanations of macroscopic evolution in terms of microscopic genes and molecular sequences of nucleic bases in DNA are known to us. Placing the concept of evolution at the law level clarifies its status; it is not a theory.

An Intelligent Designer would create only successful species, but evolutionary theory can account for the many unsuccessful ones. If Intelligent Design fails so badly to account for the real world, is there any justification for its continued promotion?

In contrast, the premise of Intelligent Design fails to meet even the most fundamental elements of rational inquiry. By being able to account for everything by divine edict, Intelligent Design explains nothing.

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The Fellowship of the Rings

UFO Rings versus Fairy Rings

Fungal diseases, mushrooms, fairy rings (a fungus ring), bioluminescent fungi, and slime molds are presented as possible explanations for some UFO rings or "landing rings."

ÁNGEL M. NIEVES-RIVERA

"We all agree that your theory is mad. The problem which divides us is this: is it sufficiently crazy to be right?"—Niels Bohr

Unidentified Flying Object (UFO) phenomena have existed since the beginning of mankind itself; strange and unidentified objects have been seen in the skies for millennia. A "cascade" of UFO cases have been described over the years (Hynek 1972; Steiger 1976; Hendry 1979; Klass 1986; Robiou-Lamarche 1979). Nowadays, with the advances of science in fields such as astronomy, meteorology, and biology, the "flying saucers myth" is seen today with disdain by scientists for the simple reason that there is no physical evidence for it. Many UFO cases are based almost entirely on nothing more than personal observation.

Although personal testimony is considered valid in any court of law, applied sciences have more rigorous standards to validate evidence. This article provides a down-to-earth explanation for the phenomenon known as "UFO landing rings" or "UFO rings."

When a UFO allegedly interacts with the environment and leaves physical or tangible evidence, some call this a "Close Encounter of the Second Kind" (or CE-2). This term was coined by the late J. Allen Hynek, an astronomer who consulted with the U.S. Air Force on Project Blue Book and was a lecturer on UFOs for more than twenty years. According to Hynek (1972) this interaction, what he called "physical trace evidence," can be with abiotic matter (marks, holes, or rings made on the ground), or with biotic matter, as when plants or animals are affected. A catalogue of more than a thousand cases in which the UFO was both seen and left physical traces have been compiled by investigators (Hynek 1972; Steiger 1976; Hendry 1979; Fuller 1997; Phillips 1999).

UFO rings fit the general description provided by Hynek (1972) as "either as circular patch (or patches), uniformly depressed, burned, or dehydrated, with an overall diameter of [about thirty feet] or more and [one foot] to [three feet] thick (the inner and outer diameters of the ring differ by that amount, while the ring itself may be quite large)." Furthermore, "the most frequently reported diameters are twenty to thirty feet" (Hynek 1972). In most cases, the rings persist for weeks or months—sometimes years—and the interior of the ring or the whole circle remains barren for three to six months (Hynek 1972; Howe 1999). Scientific explanations about the origin and implications of the UFO rings were reported by Condon (1968). He concludes, however, that the main problem with the UFO rings is the difficulty of establishing that the rings or imprints actually were made by an extraordinary object or being. The existence of an imprint of odd shape, circular area of crushed vegetation or a barren spot often can be established (figure 1). Its mere existence does not prove, however, that the markings were made by any extraterrestrial being or vehicle (Condon 1968).

The alleged UFO rings I have personally examined can be explained away as hoaxes, meteorological effects, and damage to plants caused by natural factors (abiotic and biotic). Abiotic factors, such as chemical and physical soil effects on plant growth, are extremely complicated; it is difficult to describe the effect of one isolated factor and ignore the influence of others. Examples of abiotic factors include mineral nutrition imbalances (Evans et al. 1991), soil alkalinity or acidity, extreme temperatures, soil humidity imbalance, pollution, and excessive fertilization (Alexander 1991). Examples of biotic factors include diseases, like those caused by insects, nematodes, bacteria, fungi, and viruses (Agrios 1997).

Take turfgrasses for example. Many rings or patches in turfgrasses are caused naturally by fungal (and/or other microorganism) diseases, which are strikingly similar to "unexplainable" UFO rings or crop rings. Fungi, which naturally occur in topsoil, may become a plant disease under certain favorable conditions (favorable to the fungus) such as stress, wounds, immunodeficiency, etc. (Alexander 1991; Agrios

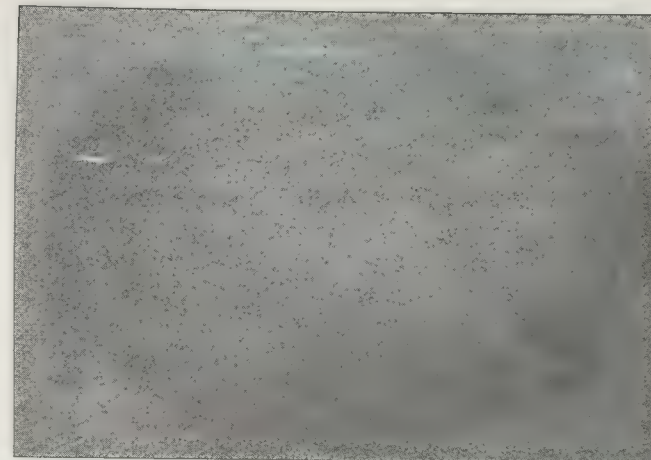


Figure 1. "Enigmatic UFO ring" found on a residence's lawn in Cupey, Puerto Rico. Photo by Lucy Guzmán (www.ovni.net).



Figure 2. Snow mold of turf grass caused by *Typhula*. Photo by J. Drew Smith.

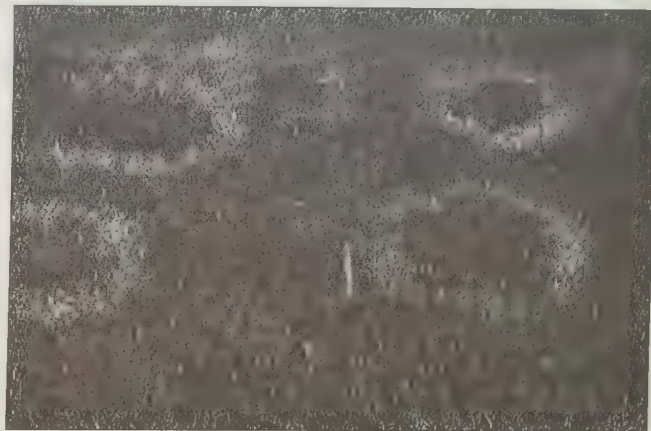


Figure 3. Damping-off of turf grass by *Rhizoctonia*. Photo by J. Drew Smith.

1997). Fungal diseases such as snow mold (*Coprinus*, *Typhula*; figure 2); powdery mildew (*Erysiphe*); damping-off (*Fusarium*,

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Figure 4. *Pythium* damping-off of turf grass, see enlarged filaments. Photo by J. Drew Smith.

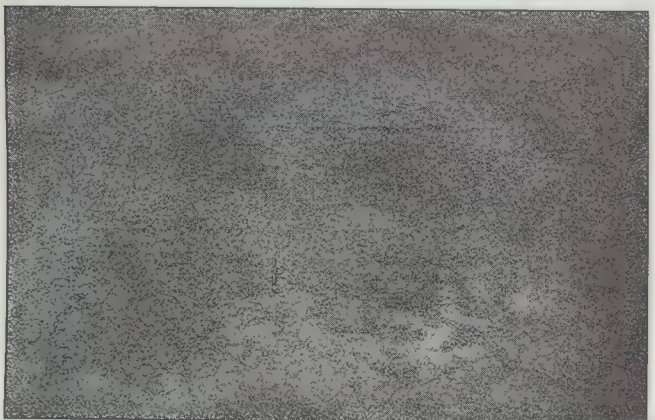


Figure 5. *Ophiobolus* patch caused by *Gaeumannomyces*. Photo by J. Drew Smith.

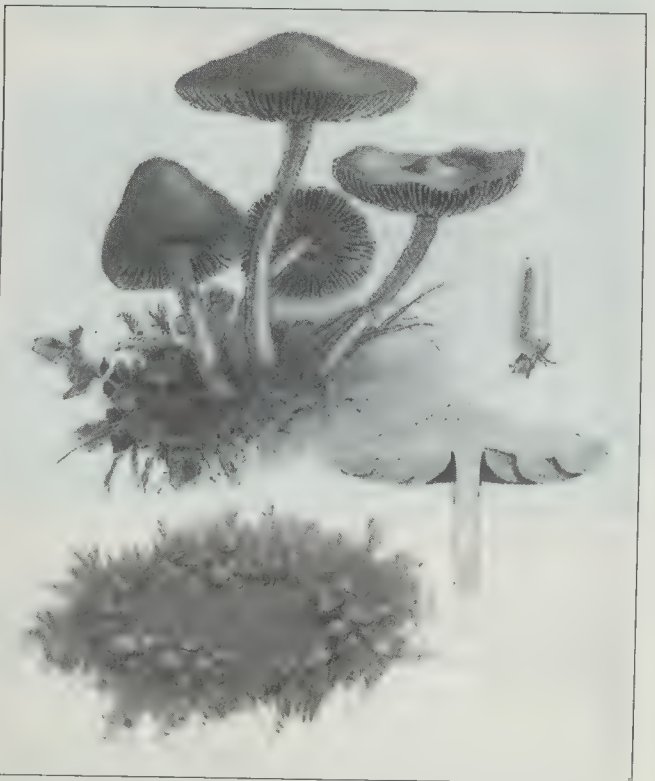


Figure 6. Fruitbodies and fairy ring: *Marasmius oreades* from *Our Edible Toadstool and Mushrooms* by Hamilton W. Gibson, 1895.

Helminthosporium, *Pythium*, *Rhizoctonia*; figures 3 and 4); take-all or *Ophiobolus* patch (*Gaeumannomyces*; figure 5); and brown patch (*Rhizoctonia*) commonly infect creeping bentgrass, Kentucky bluegrass, and Bermudagrass, among other turfgrasses (Couch 1995; Agrios 1997; Provey and Robinson, 2001; Nieves-Rivera, 2001, in press). Photos of diseased turfgrasses presented by Couch (1995, plates 1 to 29), Evans (2000), Provey and Robinson (2001), and photos of alleged UFO rings (Robiou-Lamarche 1979; Fuller 1997; Howe 1999) are practically identical. Many of these fungal diseases form rings, spots, or circular formations similar to UFO rings. Curiously, the powdery mildew caused by the fungus *Erysiphe* and the damping-off of seedlings by *Pythium* (see figure 4) produce a white powder or filaments that cover the entire blade of the grass, reminding me of "Angel Hair."

Fairy Rings

Fairy rings may also have been confused with UFO rings (Anonymous 1968; Janosch 2001). Fairy rings are fungus rings, generally produced by mushrooms (some sixty recorded species), and very frequently occur in grass, grasslands, and woods (Hawksworth et al. 1995). It is a fungus mycelial (mycelium) growth in which the fungus, originating in a central spot, spreads outward in an ever-widening ring.

According to Hawksworth et al. (1995) there are three types of fairy rings: (1) those in which the development of the fruitbodies has no effect on the vegetation, i.e., *Chlorophyllum molybdites* (see photos in Fernández 2001); (2) those in which there is increased growth of the vegetation, i.e., *Calvatia cyathiformis*, the fruitbodies of which are at the outer edge of the ring, *Lycoperdon gemmatum*; and (3) those in which the vegetation is damaged, sometimes so badly as to have an effect on its value, i.e., *Agaricus praerimosus*, *Marasmius oreades* (figures 6 and 7). Rings of the third type are frequently made up of outer and inner rings in which the growth of the vegetation is strong with a ring of dead or badly damaged vegetation between (Hawksworth et al. 1995).

Fairy rings started from a mycelium, the growth of which is at all times on the outer edge because of the band of decaying mycelium and used-up soil within the ring of active hyphae. The mean growth of a ring of *A. praerimosus* is twelve cm in radius every year (zero to thirty cm annually); that of one of *Calvatia cyathiformis* is about twenty-four cm. From this, the ages of rings of these two fungi in Colorado, sixty and more than 200 meters diameter, were thought to be 250 and 420 years old; parts of *A. praerimosus* rings were possibly 600 years old (Hawksworth et al. 1995).

Ghost Lights

Among CE-2 cases I have had the opportunity to see and/or read about are tales about glowing marks on the ground, "phosphorescent patches," or "ghostly lights" in the forests. Fungi are capable of lighting up the woods. Bioluminescent mycelium, spores, and fruitbodies of some mushroom species (i.e., *Armillaria*, *Mycena*, *Omphalotus*, *Panellus*) usually grow in wood, soil, and leaf litter. The mushrooms produce a non-

pulsing light which attract insects that spread fungal spores. Studies of bioluminescent mushrooms are included in Newton (1952), Herring (1978), and O'Kane et al. (1990). For excellent photos see www.luxgene.com.

Bioluminescent fungi are by no means a recent discovery. One of the earliest accounts of bioluminescent fungi in the New World was published by Spanish chronicler Gonzalo Fernández de Oviedo in 1526 (Glawe and Solberg 1989). I personally have had the opportunity to see this curious phenomenon in the Big Tree trail at the Caribbean National Forest El Yunque in Puerto Rico (Nieves-Rivera 2001). This might be an explanation for the ghostly green-bluish lights, the glow-in-the-dark "foxfire" in the United States, or apparitions seen at night in the forests by the locals since ancient times. They may also be precursors of many folk tales and legends (Nieves-Rivera in press), including many "ghostly light" tales of the woods (Robiou-Lamarche 1979).

Bioluminescent fungi might be an explanation for the ghostly green-bluish lights, or apparitions seen at night in the forests by the locals since ancient times. They may also be precursors of many folk tales and legends, including many "ghostly light" tales of the woods.

In 1973, a small suburb of Dallas was terrorized by a moving bright yellow blob of an undetermined organism crawling into house lawns' turfgrasses. This yellow blob known as plasmodium (figure 8) was immediately mistaken as an alien entity in the form of microbes that had started an invasion of Earth (Sharnoff 1991; Nieves-Rivera 2001). The news kept the spellbound attention of many Americans, similar to Orson Welles's classic radio transmission about an alien invasion on Halloween Eve 1938. Fortunately, mycologists quickly dismissed any Extraterrestrial Biological Entity (EBE) hypothesis and identified the blobs as part of a slime mold or myxomycete. The slime mold responsible for the invasion of turfgrasses was the scrambled-egg slime, *Fuligo septica*. For further details of the taxonomy, biology, and distribution of this and other slime molds, see Stephenson and Stempen (1994).

Slime molds, in general, are decomposers that cover low-lying plants with plasmodium and fructification without "infecting" them, for example *Diachea thomasi* (figure 8) and *Physarum cinerea* (figure 9). For those who encounter slime molds in turfgrasses and other plants in your yard, my recommendation is to avoid using fungicides, mow the lawn, and put your fears to rest!

Another interesting association involves fungus lore and

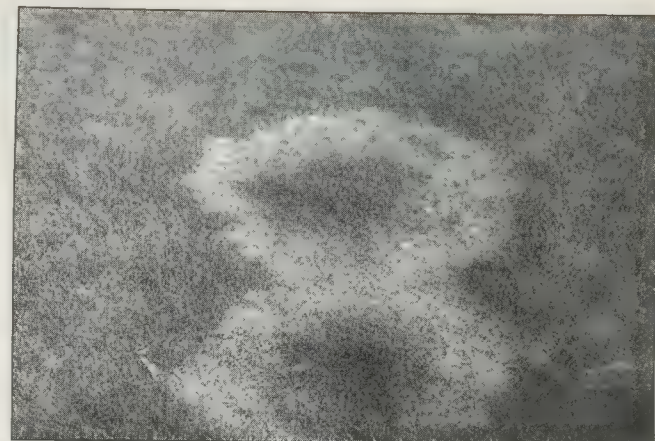


Figure 7. Curious "8-shape" caused by *Marasmius oreades* fairy ring. Photo by Leuan R. Evans.



Figure 8. Slime mold *Diachea thomasi*. Photo by Bill Roody.

naturally atmospheric (thunderstorms, lightning bolts) and astronomic (shooting stars, meteorites) phenomena (Nieves-Rivera in press). This strange association might explain many CE-2 episodes in ancient and modern times. This fascination began with the observation of the skies by ancient cultures and their attribution of unnatural phenomena to the gods. For the ancient Greeks and Romans, after a thunderbolt struck on the ground, mushrooms (single or gregarious, sometimes as fairy rings) such as boleti, puffballs, and tubers arose from it. An



Figure 9. Slime mold *Physarum cinerea*. Photo by J. Drew Smith.

example is the "fairy butter" or "star-jelly" (*Tremella lutescens*), a yellowish jelly-fungus often found after a heavy rain, a favorite folklore candidate associated with shooting stars or meteorites. Even the dye-maker's false puffball (*Pisolithus tinctorius*), which forms a large irregular club with a narrow stem-like base submerged in the substrate, resembles a stony-iron meteorite lying on the ground. If sliced, the peridioles² are exposed, giving the false impression of a stony-iron meteorite as shown in Haag's (1997) or NEMS (1998) catalogues.

In conclusion, true fungi (plant pathogenic microfungi, mushrooms) and fungal-like organisms (slime molds) offer an interesting and often overlooked explanation for some UFO landing ring cases. Future eyewitness accounts of such UFO encounters should be taken seriously, but every effort should be made to obtain tangible evidence. Not all CE-2 cases are easily explained, but from what I have seen, there is nothing "unearthly" about them. Current evidence suggests that most UFO landing rings are cases of mistaken identity or willful deception.

Acknowledgments

I thank Dr. S. L. Stephenson for supplying the photographs by B. Roody, Drs. I.R. Evans and J.D. Smith for supplying the turf grass

disease photographs, Dr. E.H. Williams, Jr. and Ms. N.N. Mercado for reviewing the text, and Mrs. L. Guzmán (www.ovni.net) for assistance.

Notes

1. Angel Hair are stringlike lines that fall from the sky and form unique patterns. They look like cobwebs or filamentlike substances, often white, gray, or yellowish. It is said that this substance sublimates in a few seconds after falling (from www.crystalinks.com/angelhair.html).
2. Pea-shaped chambers containing the spores.

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BOOK REVIEWS

A Dictionary of Skeptical Splendor

AMANDA CHESWORTH

The Skeptic's Dictionary: A Collection of Strange Beliefs, Amusing Deceptions, and Dangerous Delusions.

By Robert Todd Carroll. John Wiley & Sons, New York, 2003. ISBN 0-471-27242-6. \$19.95.

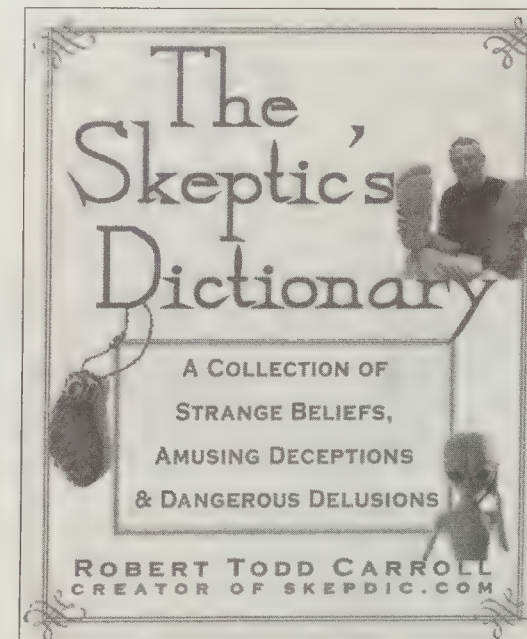
For almost a decade now, the online Skeptic's Dictionary at www.skepdic.com has provided a beacon of light to cyberspace dwellers of all shades and flavors. Journalists, educators, students, doctors, lawyers, itchy-bum chiefs . . . we've all visited and returned time and again, dipping into the a-through-z of the bizarre, unusual, and fantastic. Robert Carroll's creation has served the virtual community well, becoming a valuable aid in research and understanding. The Web site has become a reliable guide in navigating the gobbledygook that has accumulated through millennia of human history and continues to pervade our civilization.

Now, care of John Wiley & Sons, Carroll has turned his masterpiece Web site into a book—typed words on paper, illustrations sprinkled about the pages, bound together and portable—with great gift possibilities.

The Skeptic's Dictionary: A Collection of Strange Beliefs, Amusing Deceptions, and Dangerous Delusions came out in August 2003. From *acupuncture* to *zombie*, readers will be entertained and enlightened with hundreds of topics from the paranormal, the supernatural, and the pseudoscientific; from the fields of logic, science, philosophy, and skeptical investigation.

Encyclopedias, dictionaries, and

other collections of this sort usually just sit on bookshelves collecting dust, taken down for a quick reference check or to refresh our understanding of a specific



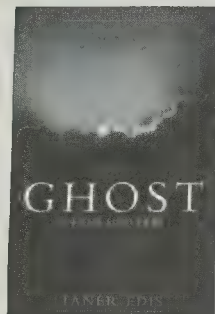
subject. *The Skeptic's Dictionary* certainly allows for these possibilities but it is also a surprisingly good read all on its own—for those moments we have set aside to relax and enjoy an interesting book. The rich and diverse subject matter is presented in informative and digestible chunks, written with great clarity of language. Sources for further reading are given with most entries, and the bibliography provides a collection of some of the best in skeptical literature.

From the budding teenage magician to the retired physicist wondering why on earth we remain so scientifically illiterate, *The Skeptic's Dictionary* spans generations and is accessible to all ages.

Dipping in at random we discover that veterinarians who use alternative medicine on their patients have been labeled "animal quackers," we are introduced to the bizarre practices of exorcism and trepanation, as well as the unusual characters who have made the occult what it is today. We learn about how our perception can be fooled by illusions and the many cognitive fallacies we face. We are entertained by the hoaxes perpetrated on mankind, frightened by the large number of cults existing today, and frustrated by the continued appeal of conspiracies and the success of cold-reading techniques.

Little nonsense has escaped Carroll's eye, and he has not only woven a web but a book that should be a staple of everyone's diet—part of the package we are given at birth to help us avoid the dangers and pitfalls of living in a world riddled with bad ideas and empty promises. . . .

Amanda Chesworth is educational director for CSICOP and directs the Inquiring Minds program at www.inquiringminds.org.



Religion in a Scientific World

PHIL MOLE

The Ghost in the Universe: God in the Light of Modern Science. By Taner Edis. Prometheus Books, New York, 2002. ISBN1-57392-977-8. 330 pp., Hardcover, \$29.

Biologist H. Allen Orr once noted that discussions of science and religion have a way of turning otherwise intelligent people, as if by magic, into idiots. Few other topics inspire so many simplistic judgments based on even more simplistic concepts, and so mortally wound attempts at serious analysis. Taner Edis, a physics professor at Truman State University, intrepidly enters this intellectual climate with his new book *The Ghost in the Universe*. Succeeding where so many others have failed, Edis examines religion in the spirit of honest inquiry, while simultaneously understanding the appeal of religion to believers. In the process, he cogently discusses topics as wide-ranging as theology, biblical criticism, the historical origins of Islam, and philosophy of science.

Edis uses a dialectical method similar to Karl Popper's "conjectures and refutations" to explore the strengths and weaknesses of theistic arguments. Ultimately, he finds many theologians occupying the contradictory position of claiming God is the ultimate ground of all being while retreating from claims about how this all-important God affects his creation. This approach is dishonest, because the God most people want to believe in must be more than an abstract concept. If God really exists, we should be able to find evidence that the world is his creation. The lack of any such evidence is the true reason for the vagueness in our modern talk of religion, and our maddening fondness

Phil Mole frequently writes about issues in science, religion, and philosophy. He lives in Chicago.

for simplistic models. As Edis explains, "Serious religious belief and unbelief are both handicapped by their over-reliance on conceptual arguments. . . . Liberal theists say the fact of biological evolution has no significance for religion. Atheists

ator who designed the universe for human happiness.

That is not what happened. Astronomical discoveries revealed that Earth was not the center of the universe, and there was no difference between the composition of elements in the "heavens" and those on Earth. Furthermore, much of the universe appeared hostile to life, and the overwhelming size and age of the universe challenged the notion that it exists primarily for our benefit. In fact, natural selection showed man is not the pinnacle of a great chain of being, but the contingent product of the struggle for existence, and modern physics reveals an eternal universe, with no need for a Creator to set things in

As Edis demonstrates, scientific naturalism has gradually undermined theological explanations of the world.

say, 'Science can never lead us to God. It can't even try,' and concentrate on refuting the classical proofs. Neither are taking their fact claims seriously enough. . . . However practical this arrangement may be, it does not help us take God seriously."

Intellectually sophisticated believers and atheists alike have rejected the old model of God as a "Great Boss" in the sky, but have not been able to replace it with anything meaningful.

The great strength of *The Ghost in the Universe* lies in Edis's lucid explanation of how and why we arrived in this predicament. As he demonstrates, scientific naturalism has gradually undermined theological explanations of the world. During the Middle Ages, theology was the "queen of the sciences," the organizing paradigm for philosophy, history, and the burgeoning natural sciences. Religious thinkers across the intellectual spectrum assumed that the sciences would testify to the glory and majesty of God, and confirm the traditional view of God as a benevolent cre-

ation. Knowledge of both psychology and the physical sciences refutes the concept of a spiritual reality beyond the empirical world—traditionally a main component of theistic worldviews. Finally, objective historical research showed religion to be a social institution with all of the contradictions of other human endeavors.

The overwhelming success of naturalism cannot help but have deep implications for the ways thoughtful people conceptualize, or fail to conceptualize, the nature of the divine. As Edis states, we no longer seem able to base our concept of God on anything real, and the entire spiritual worldview seems deeply mistaken. But if Edis is right, what attitude should we adopt toward religion? He rightly rejects the sentimental arguments that religion is philosophically necessary to find higher moral meaning in the world, but remains respectful of the role of religion as one possible way to express meaning.

Edis understands, as too few secular humanists do, that the value of religion

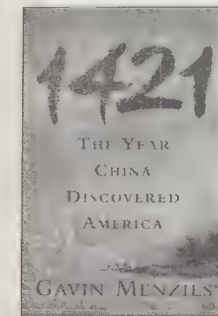
is not reducible to its fact claims. In a concluding chapter called "The God of Song and Story," he points out that narratives effectively express an aesthetic and moral understanding of life, even if the narratives are not factually "true." He describes the sense of wonder that he and many other readers experience through the purely fictional work of writers like J.R.R. Tolkien. Drawing a perceptive analogy with sacred literature, Edis also argues that Tolkien's vast body of mythological lore, resulting partially from his many volumes of unfinished material, negates the possibility of carving a fully coherent worldview out

of great author's work. Yet, against the claims of fundamentalists seeking simplistic and inflexible understandings of scripture, Edis asserts that this complexity is precisely what makes sacred stories so vitally resonant with human needs. As Edis concludes,

At their best, they are stories we can appreciate regardless of whether they are remotely true, morally uplifting, or practically significant. After all, human hopes and desires are an incoherent mess, so to consistently speak to us, a myth must be able to generate many different, contradicting levels of meaning. So even the strange, disreputable corners of religion—Gnostic visions and mystic cosmologies,

demented apocalyptic fantasies, legends of magic and mystery set in ancient times—are wonderful stories.

Edis surely knows this argument can only go so far—most of the religious faithful want to believe that their myths provide meaning as well as disclose deep realities about the purpose and design of the universe. However, Edis gives theists and secular humanists alike plenty to consider. No one interested in the complex phenomena of religion can afford to ignore Edis's book. It is a rare work of great honesty and empathy, and may be one of the few truly essential books about science and religion of recent times.



Rewriting History with a Grand Theory

DAN KOCH

1421: The Year China Discovered America. By Gavin Menzies. William Morrow, New York, 2003. ISBN 0-06-053763-9. 552 pp. Hardcover, \$27.95.

Gavin Menzies, the author of *1421: The Year that China Discovered America*, is a retired Royal Navy sub commander, and perhaps only a seaman could have written this book. The book has the feel of a traveler's tale, a seaman's yarn, all 500-plus pages of it. Sailors are great readers—what else to do on long night watches?—and Menzies appears to be very broadly read in a wide variety of subjects related to his thesis—among them history, cartography, archaeology, art history, and travel books.

The book can be entertaining viewed as a sort of roller coaster ride through a wide variety of scholarly areas. For those who enjoy going around the world in a book, Menzies will take the reader through an interesting variety of scenes, all thanks to what I would refer to as his Grand Theory: that the European age of discovery was based on an earlier (and "still unrecognized by the stuffy acade-

mic thinkers protecting their turf") Chinese age of global discovery.

Menzies's Grand Theory could be summarized as containing two separate yet closely articulated internal claims. The primary claim is that the several voyages of the great Chinese admiral Zheng He during the sixteenth century, well-known to scholarship, actually completed the first circumnavigation of the globe, supported by a massive logistic effort that included the construction of astronomical observation platforms all over the world. The subsidiary claim is that the maps and navigational data on which the later European explorers such as Magellan, Columbus, and Cook depended were based on original Chinese maps—which have since disappeared.

To the reader interested in the latest in "alternative" world history, this is fun stuff. But there will be other readers, professionals and skeptics among them, who may find the book to be less enter-

taining and more an exasperating example of the wealthy amateur run amok.

Possibly the weakest aspect of the book is the specious logic that underpins the author's entire enterprise in asserting the validity of his Grand Theory. Like so many authors in the "alternative history" genre, Menzies places his theory in front of the data. The logical basis for the theory could be summarized in the following proposition: "The Grand Theory requires this evidence to be valid; therefore here is the evidence that supports the Grand Theory."

And there is certainly a long list of data-sets in the many Appendices that are presented as evidence. It is only that the "internal facts" of the evidence are often ignored, because these facts may in fact have no support for the Grand Theory.

Out of the many examples of physical evidence offered his Grand Theory, I will focus on the ones I know best: the stone structures and archeological sites of the Pacific—specifically the part

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known as Micronesia. As Menzies presents his theory, the fifteenth-century Chinese had to have built large stone structures in their circumnavigational voyages in order to take sun and star readings for their maps. And, as his particular brand of circular logic seems to demand, since this theory is correct, then every important archaeological complex, such as Nan Madol in the present day state (and island) of Ponape in Micronesia, was built by the Chinese.

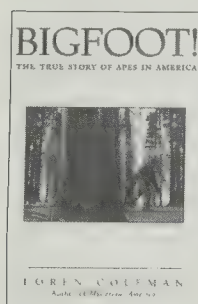
There is one serious problem with this claim. There is not single shred of internal evidence from Nan Madol that connects it with fifteenth-century China. On the contrary, every bit of

evidence we have on Nan Madol supports the orthodox scholarly theory that well-organized Micronesians had planned, built, and occupied Nan Madol approximately 200 years prior to the fifteenth century, without the help of any known outside group—European or Asian.

While it is not possible to say that all of the existing evidence is explained by the current theory, certainly there is no data from Nan Madol itself that requires the presence of fifteenth-century Chinese, and no one who studies the data would need such a presence, with the sole exception of Gavin Menzies.

A book such as this one has an

understandable appeal to many readers, and it contains the kernels of some ideas that are probably valid, such as the notion that the medieval world was more interconnected than we tend to recognize. But its weaknesses are significant, and the danger is that the book, and so many others in its genre, promotes wishful thinking and circular reasoning as a replacement for sound conclusions based on the scientific method. In today's world, we can ill afford to allow such practices to emerge unchallenged and dominate public discourse, and must continue to support informed thinking and critical review through periodicals such as SKEPTICAL INQUIRER.



A New Look at Bigfoot

BENJAMIN RADFORD

Bigfoot! The True Story of Apes in North America. By Loren Coleman. Simon & Schuster, Inc., New York. 2003. ISBN 0-7434-6975-5. 278 pp. Softcover, \$14.

Loren Coleman has been investigating mysterious animals for decades, and is author of several books on the topic, including *Cryptozoology A to Z* and *The Field Guide to Bigfoot, Yeti, and Other Mystery Primates Worldwide*. His latest is *Bigfoot! The True Story of Apes in North America*. The book is light on hard evidence—there are no in-depth discussions of hair fibers or footprint finds—and instead deals with the general phenomena of Bigfoot, including the creature's cinematic history and a survey of Bigfoot researchers.

Coleman discusses the famous 1967 Patterson/Gimlin Bigfoot film and its

Benjamin Radford wrote about Bigfoot in the March/April 2002 SKEPTICAL INQUIRER. His book Media Mythmakers: How Journalists, Activists, and Advertisers Mislead Us was published in September by Prometheus Books.

circumstances, though some of his descriptions are a little subjective. For example he says Roger Patterson's pony "smelled the creature and reared, bringing both pony and rider to the ground" (p. 82). (We know the pony reared, but there's no way to know if it was because it smelled a Bigfoot, as Coleman matter-of-factly states.) This subtle shift from reporting to advocacy appears in other places as well.

Coleman says of the Patterson creature that "this filmed Bigfoot does not lock its knees; this would be extremely difficult for a hoaxer to do and yet look as smooth as this creature's walk" (p. 96). Yet experiments conducted by David Daegling and Daniel Schmitt (and published in the May/June 1999 SKEPTICAL INQUIRER) found it was instead quite easy to duplicate the smooth gait seen in the film.

Coleman includes a chapter on the

Minnesota Iceman, a "man left over from the Ice Age" exhibited in a block of ice as a sideshow attraction. The Iceman's background is too fantastic and involved to go into here, but suffice it to say that it involves an anonymous millionaire, a creationist conspiracy, a Bigfoot shot and killed in Minnesota, a showman known for spinning wild tales, and a fake Iceman/Bigfoot that was deviously switched for the "real" one. Despite its thoroughly dubious provenance, two respected cryptozoologists, Ivan Sanderson and Bernard Heuvelmans, were certain it was not a sideshow illusion but a real, modern human ancestor. (Heuvelmans believed it to be a Neandertal killed in Vietnam.)

One of the questions surrounding the Iceman is, if it really was a Bigfoot (and not a faked dummy), why hadn't anyone else noticed it during the years it had been on public exhibition in many states? Coleman answers by quoting Sanderson: "Just how many people with proper training in any of the biological sciences...go to such shows? If any do, how many are trained physical anthropologists or primatologists? ... The answer is: practically no one who attended the exhibit (p. 112)." Yet this simply begs the question; one could as well ask how much Sanderson and Heuvelmans know about carnival exhibits and illusions.

They would not be the first scientists to be fooled by tricksters.

Coleman claims that the Iceman "was never a carnival exhibit," (p. 115) and that it was instead shown at shopping malls and state fairs (as if the latter did not have midways). "The elitist practice of labeling the Minnesota Iceman a 'carnival exhibit' is a way to immediately diminish the possible significance" of the Iceman, Coleman writes. Yet Sanderson himself seems to suggest that the venue was less than respectable when he asks how many educated, trained biologists would "go to such shows." If it was not displayed as a carnival attraction, that would be news to Verne Langdon, a long-time special effects artist whom the Iceman exhibitor approached to make a life-sized fake. Langdon claimed in a recent article in *Cult Movies* magazine (number 38, page 69) that the Iceman was to be used for appearances "on carnival midways." In fact, Senior Research Fellow Joe Nickell saw the exhibit first hand at a carnival midway—at Toronto's Canadian National Exhibition on August 19, 1973.

Coleman delves into new territory with a chapter titled "Sex and the Single Sasquatch." Jokes about large feet aside, Bigfoot sex is a legitimate avenue of inquiry—the creatures would have to have a large enough breeding population to survive through generations. (Though apparently not all of them breed; Coleman writes that some Bigfoot might

be gay and more randy males are said to have a bent for bovine buggery.)

In chapter 2, Coleman discusses "The Strange Cast of Skookum," a mud impression discovered in Washington state in September 2000 by the Bigfoot Field Researchers Organization (BFRO). A large cast was made of the impression, said to contain the body print of a reclining Bigfoot. Hair, saliva, and waste samples were also collected, raising the possibility of DNA analysis. If authentic, this find has the potential to reveal a trove of useful information.

The BFRO has repeatedly refused to provide outside investigators—myself included—access to the cast. In stark contrast to open scientific inquiry, the experts who were allowed to examine it were hand-picked by the BFRO to be filmed for a documentary. Those who wish to see their "evidence" can pay \$35 for the documentary on DVD available through a company called Whitewolf Entertainment. The fact that supposedly scientific findings must be purchased though an entertainment company instead of appearing in peer-reviewed journals reveals much about the BFRO's credibility.

Though Coleman spends five pages discussing the Skookum Cast, he stops just short of actually revealing the results of the BFRO's investigation. Aside from the mud imprint, three samples were subjected to DNA analysis: unidentified hair, saliva from an apple core, and bits

of scat. Expert Craig Newton gave the results: the scat turned up nothing usable; "we couldn't conclude anything" from the saliva sample; and the Bigfoot hair sequences were "so human-like as to most likely be contaminants." In other words, the cast was largely a bust, little more than another inconclusive (albeit large) print find.

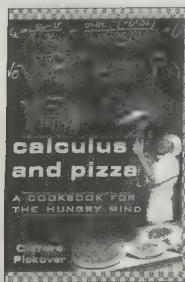
Coleman searches for evidence of Bigfoot in myths, native legends, old newspaper reports, and even a novel place: 1930s fruit crate labels. One curiosity of the history of Bigfoot sightings is that no contemporary accounts exist of Bigfoot in California between 1900 and 1957. Such a striking absence of reports seems odd, especially given the fact that four of the top five "best places to see Bigfoot" Coleman lists are in or near California. Why would creatures that have presumably lived in the area for centuries not be reported for nearly sixty years? Coleman makes an interesting (if not entirely compelling) case that a Bigfoot-like illustration depicted on crate labels provide "critical evidence for the awareness of hairy giants."

I would have liked more in-depth (and more critical) analysis; however, given its intended audience, Coleman's decision to forego detailed discussions of Bigfoot evidence is understandable. For the average reader interested in Bigfoot, this book is an accessible introduction that surveys some interesting, recent, and oft-overlooked Bigfoot topics. □

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Listing does not preclude future review.



Calculus and Pizza: A Cookbook for the Hungry Mind. Clifford A. Pickover. Wiley, New York, 2003. 208 pp., \$16.95, paper. This is the prolific Clifford Pickover's breezy attempt to give us a highly popular treatment of

some of the essentials of calculus. He sets up residence in a pizza parlor and does his best (which is pretty good) to help us understand what calculus is all about and to grasp its basic principles and rules, formulas, and problems. He hopes it "will stimulate critical thinking, get some students interested in computer programming, and suggest the usefulness of simple mathematics for solving curious, practical, or even mind-shattering problems." Illustrated with cartoon diagrams by Brian Mansfield.

The Cambridge Companion to Darwin. Edited by Jonathan Hodge and Gregory Radick. Cambridge University Press, New York, 2003. 486 pp. \$70, hardcover; \$26, softcover. A volume about the life, work, and intellectual legacies of Charles Darwin,

intended as an accessible and up-to-date guide to Darwin and his influence. The emphasis is on Darwin as a thinker and on Darwinian themes within philosophy. Contributions by seventeen Darwin scholars.

From Complexity to Life: On the Emergence of Life and Meaning. Edited by Niels Henrik Gregersen. Oxford University Press, 2003. 243 pp., \$35, hardcover. Volume of essays originating from a research symposium, "Complexity, Information, and Design: A Critical Appraisal," in Santa Fe, New Mexico, in 1999. Fundamental questions of the steady emergence of organized complexity are dealt with from leading scientists in complexity studies. Physicist Paul Davies outlines the basic ideas of an emergentist worldview. Mathematicians Gregory Chaitin and Charles Bennett present their computational definitions of complexity. Stuart Kauffman writes on the emergence of autonomous agents. Paul Davies discusses complexity and the arrow of time. Ian Stewart examines the Second Law of Gravities and the Fourth Law of Thermodynamics. Editor Niels Henrik Gregersen concludes with a chapter on "From Anthropocentric Design to Self-Organized Complexity."

Einstein: The Passions of a Scientist. Barry Parker. Prometheus Books, Amherst, N.Y.

2003. 293 pp. \$28, hardcover. This new contribution to the Einstein literature focuses on five aspects of Einstein's emotional nature that had a profound impact on his life and career: his love of learning, his love of classical music, his frequently turbulent relationships with women and his family, his strong antiwar stance, and his obsession with finding a unified theory of physics to explain all of the forces of the universe and reluctance to accept the indeterminacy of quantum theory.

The End of the Soul: Scientific Modernity, Atheism, and Anthropology in France. Jennifer Michael Hecht. Columbia University Press, New York, N.Y., 2003. \$29.50, 402 pp., hardcover. In 1876 some leading French citizens, both male and female, formed a group with the aim of proving that souls do not exist. They agreed that, after death, they would dissect each other and hopefully show a direct relationship between brain shapes and sizes and the character, abilities, and intelligence of individuals. The group helped to develop anthropology, but their interests grew out of aggressive, evangelical atheism. With this group as its focus, *The End of the Soul* is a history professor's study of science and atheism in France in the late nineteenth and early twentieth centuries.

Hen-Dubious, Cock-Sure

RALPH ESTLING

I'm assuming that these little wool-gatherings in the Outer Homilies tell you very little if anything that is new, that has never occurred to you before, perhaps many times. The web-footed, egg-laying, near-blind duck-billed platitude waddles ever after us, stalking us, sniffing and snuffling us out, making us ashamed of our pretentious windbagery and grandiose molehills. So bear with me once again while I go through the old and the obvious.

One old, obvious fact is that facts often aren't enough by themselves, they need to be interpreted correctly and unambiguously. This old chestnut struck me forcibly recently while reading Mark Ridley's *Mendel's Demon*. In it Ridley draws a perfectly logical conclusion about life in the universe based on the one example we have some information about, Earth. He concludes that, while unicellular life is reasonably common throughout the universe, multicellular life is not and, this being the case, complex and intelligent life forms are virtually nonexistent. He bases this analysis on the pretty likely fact that life began on Earth just about as soon as it could, about 4 billion years ago when things had cooled down a bit and meteorites weren't smashing into the planet quite as often as they had been. But life remained unicellular for another three or thereabouts billion years. So he decides, quite cogently, that the change

from one-celled organisms to multicelled creatures must be difficult and rare. This is certainly one very possible interpretation of the known facts.

But it could just as easily be argued from the very same facts that, given time, three billion years or so, unicellular life will evolve into multicellular life inevitably/probably/possibly. G-type stars like the sun are common and remain viable for 10 billion years, and cooler stars keep going for many times that length of time. So, using Earth as a typical example—and there is no very good reason why we should—we can pretty well assume that complex, multicellular life abiding by the universal rules of natural selection and thereby at least on occasion leading to intelligence, if not as prevalent as simple, unicellular life, is still quite likely to emerge on planets and moons of planets. This is precisely the opposite conclusion that Ridley comes to, using the same exact data but this time standing the data on their head. Stalemate. Consternation. Letters to the Editor.

The cure for this kind of reasoning, Ridley's or mine, is, of course to get more information from a wider range of sources before concluding anything; the noble art of fence-sitting. Ridley may indeed turn out to be right, but that's not the point. The point is with getting the right slant on facts, such facts as we have, which are always incomplete and often indistinct and fuzzy. Often enough in life the interpretation of facts is more difficult than assembling of

facts, because the same facts may lead in more than one direction, with all directions being perfectly logical, cogent, intelligent, in harmony with the known data—and pointing to diametrically opposed solutions. Juries find this to be the case almost invariably and scientists find this often enough to be cautious with the "facts" (well, most scientists). I think it would be a good idea for us to learn all we can about how life began and then evolved on Earth, and then go out and look for other life in lots of other places in the universe before we pronounce on the issue in any even slightly definitive terms. We are all anxious and eager to find answers to questions that intrigue and perplex us; this is natural. But the fact that it's natural doesn't compel us to yield to it without a struggle. And when *are* enough facts in? When can we be sure that *this* interpretation, and not *that* one and all the others, is the right insight? Ah, now *that*, as somebody once remarked, is the question. In *Murder in the Cathedral* (not your typical detective story), T.S. Eliot wrote that the greatest treason was in doing the right thing for the wrong reason. In science the greatest embarrassment must be to get the right answer from the wrong, though logically impeccable, deduction. Facts only sometimes speak for themselves.

Most people, including scientists, yearn for certainty, to be free from doubt, to *know*. There are grave dangers in this: one is that our yearning for certainty can drive us too fast, too hard, too

SCIENCE BEST SELLERS

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Our occasional essayist Ralph Estling writes from Ilminster, Somerset, England.

single-mindedly, and so we accept reasonable possibilities, and call them certainties. Another danger is that once we convince ourselves that we possess the truth, the right interpretation of all those messy facts that never really *quite* add up to the answer we want, we stop searching for other possible interpretations, alternatives that fit the known data but point in other directions, as with my interpretation of the facts Ridley presents. There is a third danger. As is too often the case with too many of us, if the evidence we have does not agree with the evidence we want, no problem, we just go out and "find" the evidence we want. It's bound to be there, somewhere. It's just a matter of being patient. And not too demanding.

I don't envy those who are certain they are in full possession of The Facts. They have nothing left to learn, nothing else to look for. I think that one of the most energizing, invigorating, life-enhancing thoughts must be, "I may after all be wrong." So long as we think this, we have purpose in life.

And then there is one final danger. We look and search and gather facts—and these facts and their possible interpretations make us even more confused than we were before, so we end up "knowing" even less than we did, and all those facts don't solve anything and don't lead anywhere. I suppose that's what you call life. No easy answers. No hard answers either. Life may be just a bowl of cherries, with lots of cherry pits for us to chip our teeth on under the soft, sweet fruit.

We shouldn't feel too sorry for ourselves. After all, Ridley could be dead right and there are very, very few others out there in the universe with enough brains even to have them addled with questions for which they cannot find answers. I don't think there's much point in envying the nonexistent, the intelligences that aren't there, or to be jealous of the ubiquitous microbes that may inhabit the cosmos, or to admire those who haven't the wits to be totally confused by the nature of things and the things of nature.

And if, just possibly, there is a reasonable number of reasonably intelligent beings out there in this and 100 billion other galaxies, all pondering on life, the universe, and everything, at least one or two of them might hit on something. You never know.

As things are though, the universe doesn't always listen to us as carefully as it

**As is too often the case with too many of us,
if the evidence we have does not agree with the
evidence we want, no problem, we just go
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It's bound to be there, somewhere.**

should, so we should always keep open the possibility that things may be other than we think they are, at least until we obtain absolute proof that we are right in all and every facet, and this may take a while. Up until very recently we all took for granted that all life on Earth receives its energy, in the final analysis, from the Sun. We now know this is wrong. Humility and doubt are not just nice things to have, they are essential ingredients if we're not to be absolute fools, but only the relative fools we are. With the same facts pointing in diametrically opposite directions it is best, as James Thurber has reminded us, to be hen-dubious rather than cock-sure.

I hope this latest little homily, this most recent excursion into the old and obvious, hasn't been too awful. I suppose that if a man can only write badly then it doesn't matter if he writes badly on a word processor or damp clay tablet or whether he dispatches what he's written by e-mail or dugout canoe. But however he writes and whatever he has to say, the truth is out there, somewhere, but it's an elusive little bastard. All we can do is our best, and then acknowledge that it isn't good enough. And we can try to learn, if only to learn how little we know. This may not be so difficult for us rank amateurs, but for the real

professionals, for the experts, with their overmastering systems of explanation, well, analogies involving camels and eyes of needles come to mind.

One last genuflection to the self-evident. All science, indeed, all rational thinking, is an examination of individual facts with the hope of arriving at a general, useful conclusion. This is called

induction. We should have some notion as to where we are going, where the facts seem, at least momentarily, to be leading. And so we create hypotheses, sensible guesswork based on coherent though incomplete knowledge, and test this guesswork against all the facts we can muster, including those we would rather ignore. This is called deduction. Deduction in scientific method is both necessary and dangerous, necessary because without a hypothesis, a preconception of what the individual facts seem to indicate, we are lost in a chaos of unrelated details; and dangerous because it is easy to become so enamored of our hypothesis that we tend to test the facts by the preconception, rather than the other way round.

All useful thought is founded on these two approaches working in tandem and balancing each other the way a long pole balances a tightrope walker. Without this balance we tumble into the abyss of unreason and nonthought. It is not and never was a case of "I think, therefore I am" but "I think as best I can with what knowledge I have, and therefore I am rational, though of course I may still be dead wrong."

Come. The need beckons and the hour is already late. It is time to get on with the job. □

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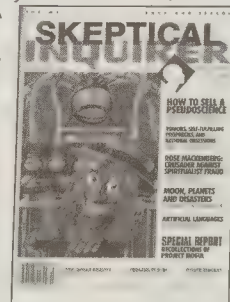
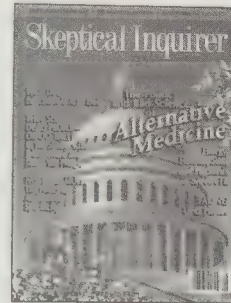
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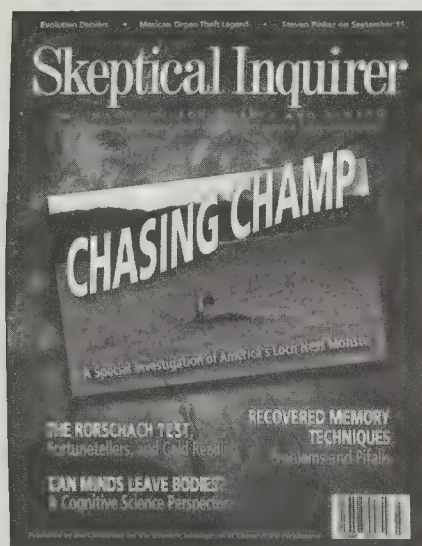
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The Rorschach Test

The article by Wood et al. ("The Rorschach Inkblot Test, Fortune Tellers, and Cold Reading," *SI*, July/August 2003) is right on target. As a Stanford psychology major (1930s), I was astounded by Rorschach Wizards, but as an amateur magician I was skeptical. Later, as a psychiatrist and burdened by Freudian dogma, I envied psychologists who had psychological tests as tools while I was supposed to only sit and listen.

As a military psychiatrist (1940s), with many patients to evaluate, I learned from Captain Kenneth Kelly how he began every psychiatric interview with a brief exposure to Rorschach cards. He used cold reading techniques to obtain cues for rapid access to useful information.

I scanned the existing literature and developed a simplified scoring tool easily taught to our residents. This, the Rorschach Evalograph, has since been updated as part of a teaching module. In 1949, I also wrote a paper, "Rorschach Test as Used in the Psychiatric Interview." Similar to the description by Wood et al., this method used cold reading and leaned heavily upon experience, insight, and intuition. I categorized ink blots like Tarot cards as cues for "depression," "anxiety," etc. This method enhanced and facilitated my psychiatric interviews, permitting me to elicit cues to quickly identify critical interview leads. I commend the authors for an insightful paper that was long overdue.

George A. Ulett
Clinical Professor of
Psychiatry
Univ. of Missouri
School of Medicine
St. Louis, Missouri

I was quite pleased with the article regarding the Rorschach Test. I have had strong doubts about the Rorschach for many years and this article validated my suspicions. My misgivings began a number of years ago when I attended a business show here in Virginia Beach. While I was walking around looking at the various booths and talking to a number of people I happened to meet a fellow who told me that he was a practitioner of the Rorschach Test. As it was obvious that I knew nothing about the test, he proceeded to show me how it works by asking me to tell him what one of the blots meant. I told him that the blot looked like Unalaska Island up in the Aleutians. He looked at me in an odd manner and then showed me another blot. I told him that it looked like one of the atolls out in the Pacific Ocean!

Then he noticed my lapel (a "Ruptured Duck") which indicates that I am a veteran of WWII. At this point he suddenly found that he had something else to do so he departed for another venue!

Robert J. Tripician
Virginia Beach, Virginia

I deeply enjoyed the piece comparing the Rorschach Test with fortune telling and cold reading. I thought you readers might enjoy the entry on the Rorschach in our *Dictionary of Psychology*, 3rd Ed., (Reber, A.S. & Reber, E.S., Penguin Books, 2003). This definition was originally written for the first edition of the dictionary published in 1985 and we have found no reason in the intervening years to change a word of it.

(Dr. Reber kindly let us print the entire entry, but for space reasons we are able to use only a portion, which follows.—ED.)

... There is a certain fascination with this test that affects all, professional and lay-person alike. In some ways, particularly among lay people, it is seen as a symbol of psychology itself and keeps finding itself on the covers of textbooks. It reflects that strange belief which many have that psychologists and psychiatrists can somehow tell you something about yourself that you would never be able to ascertain on your own, as if they possessed some mysterious ability to read through the veils of defenses and posturings which are opaque to all but these shamans and their testing procedures. Among the professionals its magnetic qualities are equally strong. The literature on the Rorschach is simply enormous and literally dozens of other projective devices have been developed based on similar theoretical principles. Yet, in the midst of all of this activity, devotion and fascination, there is little evidence that the

test's numerous indexes exhibit strong or practically useful levels of validity. Yet its supporters display an almost religious fervor in its defense and their claims often read like theological discourses and not scientific analyses; its attackers are merciless and maintain that it is totally worthless and may even be harmful because it can lead the clinician astray.

When debates of this intensity and polarity occur between honorable people there are likely to be elements of truth on both sides. The following is a personal view. It seems not unreasonable to assume that the test can be of value in a clinical setting, but perhaps not necessarily because of any intrinsic property of the Rorschach itself nor of the manner of its administration. Rather, it is likely the case that the test provides an opportunity for an extended, unbounded interaction between client and therapist with the inkblots acting as the vehicle for the interaction. . . .

Arthur S. Reber
Dept. of Psychology
Brooklyn City College
Brooklyn, New York

I found the Rorschach article very interesting, and I would like to take this opportunity to offer some additional thoughts on the matter.

The authors appropriately point out the Rorschach's psychometric limitations prior to the arrival of the Exner system. Prior to Exner's text *The Rorschach: A Comprehensive System* (1974), five distinct schools of thought regarding the administration and scoring of the Rorschach existed. While some overlap existed, these schools conflicted with each other in significant ways. One can imagine the poor reliability and validity that would be present if any instrument was approached in as little as two different manners. So, criticism of the Rorschach data from that time period is less accurately focused on the instrument per se, and more appropriately directed on the psychological community that was responsible for the various manners in which the instrument was employed. One can hardly blame the tool for being defective if it is used differently on each occasion. . . .

To say that Exner developed the most popular modern version of the Rorschach is technically inaccurate. The ten Rorschach cards are remarkably similar to those first produced by Herman himself. What Exner did was to cull the most empirical pieces of each of these five major scoring/interpretive systems, shake them up, conduct his own research, and produce a norm-referenced scoring and interpretive system. If used properly, the administrator has little room for subjective interpretation.

The authors' criticism of blind analyses is justified. However, no professional organization that I am aware of advocates blind interpretation of any form of assessment, projective or otherwise. The criticism leveled at practices employed in the 1940s and 1950s is misguided in the context of today's training environments. At no time in my training, education, or experience at professional conferences have I ever seen this practice employed. I suspect that most scientist/practitioners are aware of its shortcomings and seek to elevate the work they perform above this criticism.

The attempt to tie Rorschach Wizards to the practices of charlatans is inviting, especially to someone who is interested in drawing associations between Rorschach users and the practices and groups of people about whom society tends to take dim view. As enticing as this practice is, it is a cheap and easy way of discrediting the profession. A more useful manner of challenging the practice would be to cite and explain the current body of empirical literature that is favorable and unresponsive of this type of assessment practice. Assuming that the authors' method is a valid approach, all they have done is discredit those Rorschach Wizards, and not the instrument itself. . . .

John M. Laux
Dept. of Counseling
Mental Health Services
University of Toledo
Toledo, Ohio

I felt that Wood et al.'s article on the Rorschach Inkblot Test was a straw man argument. It spends most of its argument on refuting the impressionistic interpretations of the Rorschach. Of all of the testers I know, not one single psychologist uses the Rorschach in such a fashion.

It is overwhelmingly the case that Exner's method is used, which the authors devote only a single paragraph to. I would be far more interested in the refutation of this more scientific (or perhaps scientific) approach to the Rorschach than some obviously dubious method of interpreting the test.

I have not read their book and hope that it provides more relevant criticisms.

Scott Shimabukuro
San Leandro, California

Reading about the Rorschach reminded me of an old story of the psychologist giving the test to one of his patients. As he flashed each card, the patient replied that each reminded him of a sex object, or some sort of sex act,

or genitalia, etc. This made the psychologist so angry that he berated the patient and called him a hopeless sex fiend. The patient just shrugged and said, "Hey, you're the one showing all the dirty pictures."

Fritz Held
San Diego, California

We would all agree that a shaman peering into the entrails of a chicken does not see anything that predicts the future; but he may still be right. The guts provide a screen for intuitive projections which may be informed by his client's body language, knowledge of circumstances, etc. Additionally, the client's belief in the shaman may actually encourage him to succeed at a risky enterprise—a self-fulfilling prophecy.

Similarly the Rorschach test may be successful regardless of objective truth. We all know that a client's faith in his or her therapist is a powerful force. Furthermore, treatment of mental illness often depends very little on the diagnosis. This occurs in medications, for instance: if the first drug doesn't work, keep tinkering until you find one that does.

"Traditional" psychotherapy? Experienced therapists, no matter their theoretical orientation, all seem to end up practicing pretty much the same way. How you get started is only important because it initiates movement, after that things invariably unfold on their own—especially if the client thinks the therapist knows what he or she is doing.

True, the Rorschach test is bullshit, but it may be useful bullshit.

George F. Gjelfriend
Asheville, North Carolina

The article on the Rorschach brought back memories of my days in a Clinical Psychologist doctoral program at a major university in the early 1950s. It seems I was way ahead of the times, because I disputed the value of the Rorschach so vigorously (as well as the uncritical acceptance of Freudian doctrines—meaning the swallowing whole of Otto Fenichel on Freud), and I queried my professors about these matters enough that they dropped me from the program and I never did get my Ph.D.

Jerome Gordon
Winnetka, California

I was shocked, really shocked, that SKEPTICAL INQUIRER would use the suggestive, erotic, and just plain dirty, illustration

that appears on page 31 of the July/August issue in the article on Rorschach Inkblot Tests. You should be ashamed of yourselves. Keep up the good work.

Charles F. Hruska
Brooklyn, New York

Chasing Champ

In Benjamin Radford's article on the Lake Champlain monster (July/August 2003), filmmaker Richard D. Smith is quoted as saying that a hoax monster would be "highly expensive in terms of expertise and materials." He also suggests that a monster couldn't be smuggled to a lake, assembled, and maneuvered out onto the water without a security leak. As Ann Richards, former Governor of Texas, once said on Bill Maher's talk show, "As someone who actually knows something about the subject, may I say a few words." You see, I may not have put *the* monster in Loch Ness but I certainly helped put *a* monster in Loch Ness.

In the interest of maintaining my credibility as a skeptic I hasten to point out that this was a long time ago, I was an undergraduate at the time, and our monster was not a hoax but a publicity stunt. There is a difference.

For a few hours on the morning of March 31, 1961, a very convincing forty-seven foot monster graced the waters of Loch Ness. About a dozen witnesses saw it and it was photographed by myself and a pressman. Putting it there required little expertise and virtually no expense. Security was no problem, as the east shore of Loch Ness is a lonely place. If we hadn't called in the press no one would have known how the monster got there.

We didn't expect to fool anyone, although a distant and unprepared viewer might have had quite a shock. Since the object was to publicize Aberdeen University's Charities Week we had painted our slogan on the monster's humps. Our reward was a story and photograph on the front page of the *Aberdeen Evening Express*. (A sight gag in a past *Simpsons* episode may allude to this monster.)

This project was conceived and executed in two or three days by five Aberdeen University students. We prefabricated our monster from chicken wire covered with black cloth. It comprised a neck, a very alarming looking head, two humps, and a stubby tail. The sections were linked by six-foot lengths of thin steel rod. Each hump was based on a four-foot by six-foot frame of two-by-fours with empty oil cans for floatation. The only material not scrap or donated was the adhesive that glued the black cloth in place.

We travelled the 100 miles to Loch Ness in a borrowed panel truck and re-assembled our monster overnight by the light of a full moon. As soon as it was light enough, two of my co-conspirators towed the monster out on the loch. As Sir Peter Scott, the late great British naturalist and authority on the Loch Ness Monster, wrote, tongue firmly in cheek, "Seldom can a more dramatic photograph have been taken showing the creature in pursuit of its potential prey."

Too often the "hoax" explanation is ruled out on the grounds that a hoax would have been too complex, would involve too many people, or couldn't have been done by the supposed hoaxers. This is a mistake; creating monsters is much easier than you might think.

Tom Napier
North Wales, Pennsylvania

Benjamin Radford appears to have missed the obvious in his investigation of the Champ photo. The height of the "monster" can be estimated quite accurately by considering perspective. Assuming, as Radford did, that the camera lens was 8 ft. above water level, the creature would reach the horizon line if it extended 8 ft. above the water no matter how far out it was. The dimensions on the Mansi photo were measured with a millimeter (mm) ruler with the following results: the head reaches about 5 mm above the water and the height to the horizon is about 18 mm at the same location. Thus the animal protrudes $5/18 \times 8 = 2.2$ ft. Even if the camera lens were 12 ft. above the water, the animal would be only about 3.3 ft tall. As a check of this method, measurements were made on figure 4. The "creature" is measured to be about 11.3 mm high and the vertical distance to the horizon is about 15 mm at the same location. Therefore, the artificial creature of figure 4 is calculated to be $11.3/15 \times 8 = 6$ ft. high, which is the actual height given by Radford.

Another problem with Radford's work is his selection of a site. Clearly the site he selected does not match the one shown in the Mansi photo based on the configuration and apparent proximity of the opposite shore. Note also that the Mansi photo shows some evidence of the near shore (plant stalks, etc.) and a white line (sandy beach?) on the far shore, neither of which appear in the Radford photo.

Arthur L. Kohl
Woodland Hills, California

In reading your articles on "Champ," the supposed monster in Lake Champlain, I was

surprised to find a rather basic error by the normally astute Ben Radford and Joe Nickell as well (assuming they checked each other's material). In discussing the photo taken during July "around noon," Radford states that at noon the Sun would be directly overhead, thus casting shadows straight down.

The Sun is *never* directly overhead, or even close, on Lake Champlain. The lake is approximately 44 degrees north longitude and the furthest the Sun ever gets is to the Tropic of Cancer, 23.5 degrees (some 20 plus degrees to the south), and that only on June 21. Therefore the Sun could only be 69 degrees or less from the horizontal. This means there would be a shadow cast to the north and the directional orientation of the picture would come into play.

Sid Gladstone
Ridgefield, Connecticut

Benjamin Radford responds:

I am pleased that Arthur Kohl and I came up with similar estimates regarding the size of the "monster." While he arrived at his conclusions from a figurative (or literal) armchair, I believe there is no substitute for actual field work, and I took a different but equally valid approach. It is true—but irrelevant—that certain features of the Mansi photo did not appear in my photo. The distant shore and the plants in the foreground were not being measured; the object in the lake was. An object of a claimed height at a given distance and focal length is the same size regardless of what is in the foreground or background. We labored to find Mansi's original site, a feat even she could not accomplish. I fail to see any "problem" with either my analysis or our selection of a site.

I appreciate Sid Gladstone's point about the Sun's position. Gladstone's correction that the shadow would cast to the north fits my hypothesis just as well. The photo was taken from the eastern shore facing west. The "monster" is thus facing north, and the neck would be casting a shadow north—under the head, exactly where I described.

Can Minds Leave Bodies?

Alan Bensley's negative answer to the question "Can Minds Leave Bodies?" (July/August 2003) is surely correct. But it could be strengthened by some philosophical supplementation, inspired by *Alice in Wonderland* and *Alice Through the Looking Glass*.

Certainly the familiarity and the intelligibility of talk about minds and about souls does entitle us to infer that we possess both a concept of mind and a concept of soul. But

these particular semantic possessions are most emphatically not what is needed if doctrines of the possible independent existence and perhaps the immortality of souls or of minds are to be cognitively meaningful.

The crux is that, in their everyday understandings, the words "minds" and "souls" are not words for sorts of what philosophers call substances. They are not, that is to say, words for entities which could significantly be said to survive the deaths and dissolutions of those flesh and blood persons whose minds or souls they were. For to construe the question whether she had a mind of her own, or the assertion that he is a mean-souled man, as a question, or an assertion, about hypothesized incorporeal substances is like taking the loss of the Red Queen's dog's temper as if this was on all fours with the loss of his bone, or like looking for the grin remaining after the Cheshire Cat itself has disappeared.

Antony Flew
Reading, United Kingdom

(Professor Flew is author of *Merely Mortal? Can You Survive Your Own Death?*, Prometheus, 2002)

Bensley's article was certainly a fascinating contribution to the debate over OBE and NDE. His arguments certainly give a plausible alternative explanation to the migration of souls from bodies, but not an absolute refutation of that hypothesis. Consider. . . . Electrical or pharmacological derangement of brain function can create very believable experiences of all sorts of sensory experience (be it being burnt, stabbed, or whatever) but that does not prove that one never can experience such experiences in reality. Likewise, various insults to the brain may well give the sensation of a "soul" leaving the body, without actually proving that such an event is truly impossible.

As always in the end, the burden of proof rests with the proponents of the fantastic. Show us an example of OBE or NDE that provides the recipient with solid information truly outside of normal bodily experience, and it's settled. No absolute judgments 'til then.

Julius Wroblewski
Vancouver, British Columbia
Canada

I absolutely loved "Can Minds Leave Bodies?" as it answered a lot of questions that I've had on the issues of OBEs.

I have accidentally discovered, as a consequence of my paramedic experience (see my

letter on page 67 of the March/April 2001 SKEPTICAL INQUIRER), a way to create a credible OBE on demand without using brain surgery or strange drugs.

The major requirement is an elevator with a mirrored ceiling.

The experimenter (an assistant is also helpful for the timing) must spin around like a dervish until he or she is thoroughly dizzy, at which point the experimenter promptly lays down on the elevator floor. This is the moment when the assistant should press the button on the ground floor.

The combination of reduced weight (from the downward motion of the elevator), dizziness, and the contemplation of one's reflection while lying stretched out on the floor reliably creates the illusion of an OBE. This illusion may be shattered—at least for me—if I see print that is backward. I don't know why.

Perhaps the OBE issue can be better explored with the structured experiments if these ideas can be used to create OBEs on demand.

Kevin Levites
West Palm Beach, Florida

Alan Bensley responds:

Flew has rightly noted that the use of commonsense terms like mind and soul creates confusion in discussions of OBE and in cognition, in general, I might add. Psychology suffers from continued use of the commonsense term mind as a technical term. To avoid dualism, I prefer the term mind/brain to refer to this naturally occurring functional ensemble. As a way to deal with the traditional baggage the term mind carries with it, I sometimes make the following distinction for traditional dualists. I suggest to them that in religious or philosophical discussions they use the term soul to refer to that which is produced by the functioning of the physical brain. Because the mind depends on functioning of the physical brain, it cannot leave the body.

Wroblewski noted that just because a disturbance in brain function produces some strange perceptual experience does not imply that such an experience might not have some "reality." That is true, but one must be careful with this line of reasoning. If one accepts that mentalistic explanations of physiological events can always be offered for the results of brain damage and can never be corresponded to physical events in the brain, then the question becomes unresolvable because of presumed mind-body dualism. Rather, I believe that it becomes increasingly less likely that minds can leave bodies as more studies like Blankens show

that stimulating the physical brain produces self-reported OBEs especially when the subjects are shown to be truthful and are tested under controlled conditions. No, we will never prove that nonphysical "minds" or souls cannot leave the body, but we may accumulate good evidence that makes such a conclusion implausible.

Levites makes an excellent point not fully developed in my article, that is, that the OBE should be studied experimentally. By being able to induce OBEs experimentally, we may study them more carefully to identify their causes. Moreover, using natural means to experimentally induce OBEs provide evidence relevant to the question of whether such phenomena are themselves natural or paranormal. As a matter of fact, McCleery and Claridge (1996) recently induced OBE-like experiences in subjects and found that those who experienced going out of the body were more susceptible to hallucinations than were those not reporting out-of-body like experiences. Studies like these provide further support for natural and psychological explanations of the OBE.

Lastly, I would like to comment on the issue of survival of the soul mentioned by Flew and two other correspondents who e-mailed me about the article. My conclusion that the mind does not leave the body in an OBE may imply that a soul or mind cannot survive death of the body, but it need not imply this. Recall that the OBE and NDE are similar but not identical experiences. Consequently, determining whether the mind can leave the body during life may not yield an answer to the question of whether it can after physical death. Given the psychological similarities of the two phenomena, however, I think the more parsimonious conclusion is that the mind cannot leave the body either before or after death.

Thought Experiments

Massimo Pigliucci's critique of thought experiments (SI July/August 2003) rests on two weak examples, for neither the zombie nor the spherical cow are really thought experiments, and they are actually good examples of what they really are.

The point of the zombie argument is to show that there are no special features of your own, first-person, state of consciousness that are perceivable to an external, third-person observer. If you imagine a creature that has all the cognitive and mental properties that you do except consciousness, how could you tell it was missing? You can't. It isn't an experiment as such, in which you ask 'what would happen if . . .', but a *reductio ad absurdum* argument that has been common in philosophy for millennia, and it is successful (for

most undergraduates in our philosophical issues of psychology course, anyway).

The spherical cow comes from an apocryphal account of the problems in making simplifying assumptions in order to fit an applied question (e.g., how much methane do cows produce?) into an existing analytical framework (e.g., reaction vessels of known volume). Cow stomachs are irregular, so hard to do maths with, but if you approximate to a sphere with the same mean diameter the plusses and minuses will cancel out, so you could legitimately consider a cow's stomach as spherical (there may be four, but perhaps only one produces methane?). This approximation is not used to derive properties "irrelevant to real cows," because it does lead to an accurate estimate of methane production. The point now is in the public communication of science: non-experts who are unfamiliar with the techniques used may be distracted from the experts' valid conclusions unless you express yourself in terms that they will understand. This problem is currently apparent in the debate over the safety of the triple MMR vaccine, for example.

Jon May
Senior Lecturer
Department of Psychology
University of Sheffield
Sheffield, England

In his "Consider a Spherical Cow," Massimo Pigliucci completely misinterprets what the philosophical consideration of consciousness refers to as a "zombie." While the term is borrowed from usages in which a dead person could be brought back to life, the philosopher of consciousness certainly is using it in no such manner. What it does refer to is the consideration of a normal person, going from womb to tomb, and not thereafter, as only a physical object, taking its analogous use of the word from idea of soullessness. The idea is that a person, so considered, as physico-chemical machine, feels, say, the cold, and responds by shivering, only in the same manner as a thermostat feels the cold and responds by turning on the furnace.

The point is to contrast this with our innate feelings that we do indeed feel, in a more subjective way than thermostats, and thus are not zombies. But, of course, we can feel this only in ourselves, and for all we know everyone else is a zombie. But that does not mean a revived corpse but rather a body acting solely on the rules of physics and chemistry.

Charles Kluepfel
Bloomfield, New Jersey

Pigliucci cites a Galileo thought experiment which purports to refute Aristotle's position that heavier bodies fall faster than lighter ones: a composite of two bodies of unequal weight should be expected to both fall faster (because it's heavier) and slower (because the motion of the heavier component is slowed by the dragging effect of the lighter and slower component).

Aristotle didn't believe in the vacuum, and envisioned objects falling through a resisting medium. He was correct in maintaining that heavy objects fall faster under these circumstances. A small steel sphere falls faster than one half its size in a jar of molasses. A composite sphere formed by fusing the two falls even faster, thus refuting Galileo. The addition of the smaller sphere doesn't retard, but actually enhances, the speed of the larger sphere.

For Galileo's argument to have validity, one has to explain why his reasoning should not be expected to apply to motion through resisting and resistance-free mediums alike. His assumption that the components retain their properties in the composite (the dragging effect of the lighter body) is contradicted by observation. The underlying assumptions of thought experiments, even those which support positions we accept, should be examined carefully.

Joe Ryan
Wallingford, Pennsylvania

I agree that thought experiments can be useful tools, and indeed I have used them many times myself. However, the experiment described in Massimo Pigliucci's "Thinking About Science" fails to mention the need for performance in a vacuum. Absent a vacuum, it is often the case that heavy bodies fall faster than light ones. As a thought experiment counter to Pigliucci's, consider two equidimensioned spheres: Sphere A is made of lead; Sphere B is made of balsa wood. I don't think there is any question that Sphere A would fall faster than Sphere B if the experiment were performed in air.

William Corcoran
Woodside, California

Massimo Pigliucci responds:

Let me start by addressing the comments about Galileo's thought experiment. Indeed, I agree with both Joe Ryan and William Corcoran that a real experiment like the one proposed by Galileo would fail, if performed in a medium that opposes resistance to the falling bodies. That is why the most spectacular actual performance of

said experiment had to wait until we put human beings on the moon. However, that is exactly why Galileo's suggestion of doing a thought experiment was so crucial in the history of physics.

About the zombies, of course Charles Kluepfel is correct that philosophers of mind don't mean to refer to creatures that actually come back after having been dead. In my column I may have confused the reader on this point. The term is inspired by said non-natural entities, but it is meant to ask on what basis one thinks that other people have internal thought processes and feelings, a perennial problem in philosophy of mind. My point was that we cannot gain much insight from this particular scenario because the idea of such an entity implies an impossibility in terms of neurobiology and common experience.

I do disagree with Jon May, though I see his point. The term thought experiment is an example of what Ludwig Wittgenstein referred to as a "family resemblance concept," i.e., it can take a gradation of meanings under different circumstances (e.g., in philosophy as distinct to biology), and yet it retains enough coherence to be a useful term. So, in philosophy, the zombie example is a thought experiment in that it asks us: if there were zombies around (i.e., creatures with no internal thought processes, but all the external behavioral attributes of human beings), then how would we go about separating them from beings such as ourselves? In physics, the spherical cow is an ideal approximation that one considers in order to solve an otherwise horribly complicated problem. This also can be recast in if-then terms: if cows had these geometrical characteristics, then their production of methane would be X. It is possible that this stretches the definition of thought experiment a bit too much, but it made for a very catchy title for the column. . . .

Gresham and 'Geek'

Massimo Polidoro's article "Blind Alley: The Sad and 'Geeky' Life of William Lindsay Gresham" (July/August 2003) was fascinating. I am glad that Polidoro is continuing Martin Gardner's tradition of exploring some of the odder byways of the culture. A future column perhaps could focus on this question: How did the word *geek* evolve to its current meanings from its revolting, chicken-biting (and worse) circus origins?

Kenneth Silber
New York, New York

Enjoyed Polidoro's article on William Lindsay Gresham. Despite my admiration for his *Nightmare Alley* and *Houdini*, I took

Gresham's claim that he invented the word *geek* with skepticism, and investigated. I was right. He may have stretched the basic meaning ("dupe," "fool," "crazy," etc.) into an autobiographical cut ("addict out of his head all the time") but he certainly didn't invent it. It's a very old word, with cognates in most Germanic languages. Variant spellings are listed in the OED: *geck(e)*, *geke*, *geek(e)*. The earliest English reference is 1515; the earliest U.S. *geek* is 1876. Shakespeare has *geck* in twelfth Night V.i.351 and (in a perhaps spurious passage) *geeke* in Cymbeline V.iv.67. Webster has *geek* in his 1828 dictionary. Well, Gresham was creative.

Richard van Frank
Montclair, New Jersey

Butterflies and 'MacGuffins'

In "The Butterfly Theory of Truth" (July/August 2003), Robert McHenry claims that for Self-Helpers and New Agers, "[i]t is not even necessary that [the truth] have any content, that there be any there there. Its function is simply to beckon, like the maguffin [*sic*] in an Alfred Hitchcock movie."

As a contributor to The MacGuffin, the Web site for Alfred Hitchcock scholars, I was naturally disappointed to see the term misspelled; as a former employee of Britannica I was even more disappointed that the publication's former editor-in-chief might make such a gaff. But more to the point, in evoking *MacGuffin* to describe the New-Age/Self-Help view of "the truth" as something ever-elusive (like a butterfly), McHenry seems to have misunderstood what is generally meant (at least among Hitchcock scholars) by this term.

Coined by writer and Hitchcock collaborator Angus MacPhail, the MacGuffin, as Hitch himself liked to say, is the thing that all the spies are after but about which the audience doesn't care. Examples include the smuggled secrets in *North By Northwest*, the hidden uranium cache in *Notorious* and the Air Ministry plans in *The 39 Steps*. The MacGuffin is thus a device to get the plot moving and to propel it forward. By definition, it cannot "beckon" the audience because the audience doesn't care. Paradoxically, it does beckon the film's protagonists, but not as some abstract concept devoid of content, as McHenry suggests. Rather, to the film characters, the MacGuffin is very real and very important, something over which they are quite willing to fight and die. I wonder how many of the crowd McHenry so rightly skewers would be willing to risk everything on their elusive butterflies.

Gary Giblin
Aurora, Indiana

Robert McHenry responds:

I am obliged to Mr. Giblin for correcting my spelling of MacGuffin. A quick Google search reveals that the spelling I used is not unknown but is pretty uncommon, and I yield to the Hitchcock scholars.

As for how I used the term, I think it a reasonable extension of the original and technically limited meaning. The elusive "truth" that I suggested is a MacGuffin is certainly the engine of much activity, some of it cynical and some of it merely deluded; but in any case that "truth," having in fact no content, cannot be of genuine value to anyone. It is only its power to induce or exploit certain beliefs in certain people that gives it its notional existence.

Professor Clarifies Policy

Regarding the U.S. Justice Department's decision to drop its investigation into my policy for writing letters of recommendation (News & Comment, July/August 2003), I offer what I hope will be a clarification.

Ralph Boyd, Jr., assistant attorney general for civil rights, is quoted as saying, "a state-run university has no business telling students what they should or should not believe in." I agree.

It should be stated, moreover, that nowhere in my Web site's original letter-of-recommendation policy was the word *believe* ever used to describe how students should mentally deal with the theory of evolution. I myself do not believe in evolution, and I would not require anyone else to do so. I do not believe in evolution because evolution is not a matter for belief. Similarly, I do not believe in gravity. One properly believes in things for which there is insufficient evidence, such as the existence of the supernatural. There are, however, mountains of evidence that evolution is a powerful agent that shapes life on Earth.

I do not concern myself with students' religious beliefs. They are no business of mine, and I do not inquire about them. I am, however, very much concerned with the science of those who wish me to recommend them to graduate school or professional school in the biomedical sciences.

As Taylor reports, my courses have a reputation for rigor. Thus, the first criterion of my recommendation policy—that a student should have earned an "A" from me—satisfies my concern that the student sufficiently understands modern biology to request a recommendation. Before I consent to do the favor of recommending him/her to advanced

studies in biology or medicine, I must be satisfied that the student can do more than merely explain the theories of modern biology.

I do so out of concern for my reputation, and the reputations of my department, my university, and my profession. I do so out of concern for the integrity of science. I must be satisfied that the student respects and employs the criteria commonly accepted by scientists to gauge the validity and reliability of evidence. Lacking this satisfaction, a student will not receive a recommendation from me. That has been, and remains, my policy.

Michael Dini
Texas Tech University
Lubbock, Texas

True Positives

In the July/August SI, page 7, top of middle column, you say that the polygraph "can produce false positives far in excess of any possible true negatives (catching a spy)." Did you mean to say "true positives" rather than "true negatives"? True positives would be the spies.

The usual problem with diagnostic tests is the lack of specificity so that false positives are too numerous.

Irwin Tessman
Purdue University

(Yes, we should have said "true positives."—EDS.)

Ossuary Assertion

I always appreciate Joe Nickell's investigative reports and I especially enjoyed reading about his efforts to tease out the history of the James Ossuary, but he seems to have missed the point in Steven Dutch's criticism in the July/August Letters to the Editor.

I can understand his taking exception to Professor Dutch's remarks concerning cranks and conspiracies, and about "skeptics react[ing] with something close to panic . . .", but Nickell's response fails to address Dutch's central assertion: even if it could be proven that this ossuary once contained the bones of that James who was a half-brother of that Jesus who is accepted as the Messiah by Christians, it would tell us nothing new. More important, it would not validate the myths of Christianity.

On this I agree with Professor Dutch. There's little doubt that there once was a political firebrand named Jesus (Joshua, etc.), that he was executed by the Romans

because he threatened the ruling elite of Israel, or that he had a brother named James (Jacob, etc.). Critical examination of the James Ossuary is interesting and worthwhile, but it's of less importance than, say, the Shroud of Turin. The Shroud purports to have some paranormal significance; the James Ossuary, even if authentic, is simply a physical artifact.

Karl Sutterfield
Eastlake, Colorado

(Yes, an artifact whose inscription has since been proved a fraud, see News & Comment, September/October 2003.—EDS.)

Joe Nickell responds:

I think it is not I who has "missed the point." My investigation was never predicated on whether the ossuary would or would not offer something new. It certainly sparked profound interest and that justifiably raised the question of authenticity.

I approached it the way sensational "finds" should always be addressed: letting the evidence lead to a solution, rather than being driven by people's agendas, pro or con. That is the point, and I hope no one misses it.

Compliment

I wish to compliment your good work! Keep it up and call me a fan!

Mary Manion
Ottawa, Ontario, Canada

The letters column is a forum for views on matters raised in previous issues. **Letters should be no more than 225 words.** Due to the volume of letters not all can be published. Address letters to Letters to the Editor, SKEPTICAL INQUIRER. Send by mail to 944 Deer Dr. NE, Albuquerque, NM 87122; by fax to 505-828-2080; or by e-mail to letters@csicop.org (include name and address).



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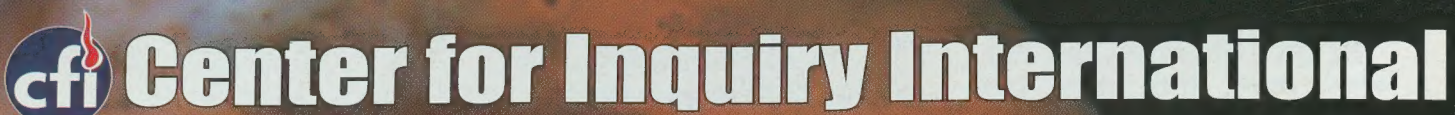
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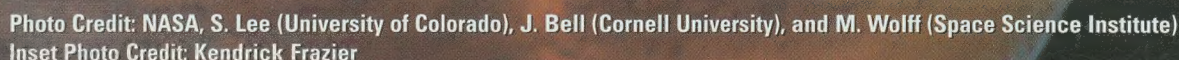
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**THE COMMITTEE FOR THE SCIENTIFIC INVESTIGATION
OF CLAIMS OF THE PARANORMAL**

Mars shines brightly in the southeastern sky above Albuquerque as SKEPTICAL INQUIRER Editor Ken Frazier views it through his eight-inch telescope (inset photo at right). Ken took the time exposure, using a time delay, the night of August 31, the last day of a month that brought Mars closer to Earth — 34,646,418 miles, center to center, on August 27 — than at any time in nearly the last 60,000 years. The close approach of Mars and its brightness in the southern sky (magnitude -2.9) has set off a new wave of interest in the Red Planet. Mars comes almost this close every 15 to 17 years, whenever it passes closest to Earth (opposition) within a few weeks of the date it is also nearest the Sun (perihelion). This year opposition and Mars perihelion (which was on August 30) were very close together in time. Calculations show Mars has not been so close to Earth since 57,617 B.C. and will not again be closer until August 28, 2287. Several new spacecraft missions are already on their way to explore Mars.



THE MAGAZINE FOR SCIENCE AND REASON

The Committee for the Scientific Investigation of Claims of the Paranormal encourages the critical investigation of paranormal and fringe-science claims from a responsible, scientific point of view and disseminates factual information about the results of

such inquiries to the scientific community, the media, and the public. It also promotes science and scientific inquiry, critical thinking, science education, and the use of reason in examining important issues.

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